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Nature, Man, and God

A Synthesis of Pantheism and Scientific Humanism

By

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INTRODUCTION

The inventive mind of man has produced a number of "philosophies of history"; but when one surveys these attempts at a morphology of social change, one is forced to conclude that there is as yet no satisfactory formula that will cover the evolution of society from its earliest beginnings to its latest developments. We do find, nevertheless, that in the long course of man's adventure on the planet, there have been transient periods of synthesis, or plateaus of unification, when the various special phases of the total culture of a society have been orchestrated into a harmonious whole. The ancient Greeks of the golden age of Pericles attained such a cultural unity, and the impressive medieval synthesis of scholasticism represented another such high-level achievement.

These top-flight syntheses of the past are not adequate for the modern world. If we are to have a new cycle of synthesis, we shall perforce have to create it out of materials which, to some extent, were not available to earlier ages. In order that such a synthesis may be attained, somehow religion and science, politics and economics, technology and ethics, will have to be brought under the influence of an overall pattern which will supply a universal moral unity for mankind. In the present book we are concerned, among other things, with this age-old breach between science and religion, and we are consciously trying to bridge the gap between man's secular knowledge and technologies and his spiritual values and motivations.

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Our argument is based on the proposition that religion, today, definitely presents a social problem. Churches as institutions, and theologies as systems of belief, are out of harmony with each other. In such a situation the attitude of the "detached spectator" is difficult to justify. Indeed, as John Somerville has pointed out, in modern controversies one is "on" a side, whether he has "taken" sides or not. At such a juncture in history one wants to be sure, if this is possible, that he is on the "right" side, in order that he may not obstruct whatever forces of progress there may be in this distraught world of ours.

Perhaps someday we may achieve a world community, composed of a federation of cultural groups in varying stages of evolutionary development. In that time it will

no longer be necessary to attempt to deflate certain religions and inflate others. Then we may find a place within this world matrix of religious thought for the several kinds of religious institutions. Quite probably, as we gradually move up from one cultural plateau to the next, men and women will outgrow archaic beliefs through the recognition of larger perspectives. Thus the more primitive religions will be transcended. Eastern and Western forms of theology and worship will then be discarded -- not destroyed -- because they will no longer attract adherents. Thus, the coming world religion -- which, if the thesis of the present book is correct, will be a kind of pantheism -- will represent the culmination of a great spiral of evolution, beginning with the most primitive form of animism and moving upward in natural sweeps of growth toward an ever-receding goal -- for there can be no ultimate religious belief until man has ceased evolving, or has come to his final dissolution.

In the writing of this book I have had the benefit of helpful suggestions from friends and critics. I think here especially of Mr. F. L. Kunz, Dr. Robert A. Clark, Miss Blodwen Davies, Mr.B. G. H. Vanderjagt (who helped me with Figure 1 of Chapter V), Dr. John Somerville, Dr. C. J. Herrick, Dr. Mario Lins, Dr. J. J. Mayoux, Dr. J. B. Rhine, Dr. G. P. Conger, Mr. Lloyd Morain, Mr. Julius Stulman, Mr. Harry L. Custard, and Dr. Charles Francis Potter. My wife, as usual, provided me with valuable help. To these individuals I express my warmest thanks.

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O. L. R.

CHAPTER I

THE TRADITION OF UNIVERSALITY

"It is doubtful whether life can be significantly lived without conscious relation to some tradition. Those who live without it .... live without roots and without loyalties. For to be significant life needs form, and form is the outcome of a quality of thought and feeling which shapes a tradition."
-- Dorothy M. Emmet

I. THE WORLD'S CULTURAL CRISIS

We live in a world of political sovereignties with a variety of social, religious, and economic doctrines. Such doctrines have existed for countless generations, and while conflicts arose between them, here and there, these clashes in the past were localized in scope and in consequences.

Of course, as the world has undergone a mechanical unification through the telescoping of space and time relations it has become increasingly difficult to limit these conflicts to local areas -- as two world wars have demonstrated -- and now, with the military uses of atomic energy and biological warfare already at hand, it has become clear to us that it would be fatal to mankind's existence to permit these clashes of doctrines, faiths, and ideologies to get out of hand and cause a third world conflict.

Looking into the future, we find there a prospect of world unity and perhaps an effective world government with a code of civil law to formalize its proper relationships. But this new world of tomorrow, where peace and justice reign in dignity and security, is still in the future, over the horizon, luring us on like a mirage.

In the mean time, however, we must live in the world of the present. It is a world of angry and scarred horizons, the valleys in between filled with rubble of dead hopes and the anguish of human frustrations. Here, in the restless present, the nations of the world find themselves in a kind of twilight zone between the world

of the past, filled with its relics of an age that is dead or dying, and a world of the future, with its tenuous and embryonic proliferations of a social order yet to be born.

This "between acts" period in human history finds the "world that was" face-to-face with the "world that is to be." These two worlds rub elbows everywhere, but perhaps the contrasts stand out in sharpest relief in such world organizations as the United Nations Organization and UNESCO as they carry on their work in New York City, Paris, and elsewhere. Here the past and the future come to grips; realism and social idealism clash; and despair and hope stare each other in the face. The problems are acute; the stakes are high; the rivalries are keen; and the tensions are electrifying.

As one surveys the many problems which confront the UNESCO program, one of the major issues which stands out in striking form is this: What is the place of cultural diversity in the world community which the United Nations is trying to foster? In general, what place do ancient provincialisms and modern localisms have in our contemporary world of planetary integrations?

Without question, the roots of such cultural diversities go far back into the past. Varying environments have elicited varying responses to the challenges presented to the peoples of the earth, and the diversities of cultural values which were thus created are in a sense the results of environment turned into history.

But now consider the consequence of this historical development: seemingly irreconcilable oppositions have been created (or intensified) which threaten to precipitate the clashes we have already referred to. It is no exaggeration to state that man's very existence is at stake. Mankind is now impaled on the horns of a tremendous dilemma: on the one side, we wonder whether cultural diversity is not a divisive force in the world, setting people apart from each other. Why, then, show kindness to diversity and regionalism -- "ethnic democracy," if you wish -- if such diversity separates peoples? In truth, is not such regionalism and diversity nothing other than a kind of cultural infantilism? Are not cultural provincialisms like the immaturities of those who, because of their age, should have put away childish behaviors to act like adults? If so, is it not time for the human race to grow up and act its age?

On the other side, all that any individual or group has is its traditions, its myths and dreams, its customs and folkways. These are intimately tied up with deep emotional aspirations, and if you propose -- in the

interest of a "higher culture" -- to make men rational and responsive to new values, must you not destroy the local cultures and values? And if you sweep away the past, induce social amnesia, so to speak, what then? What have men to live for, if you take away their traditions? And what remains to build upon?

Here we have the dilemma of the modern world in its most crucial form. If we keep our diversified and local cultures, how can we function as part of a world civilization with its overall techniques for peace, understanding, and justice? But if we do set up and participate in a world culture, must we not kill off, or at least submerge, these local cultures and ideologies, peculiar to regional groups, which threaten to divide mankind? What shall we do to resolve this dilemma? Indeed, is it possible to do anything?

To some extent, the issue here represents a clash between those who cling to the forms of the past and those who are reaching out to new and more inclusive thought- and culture-patterns of the future. But the argument is by no means a contemporary one -- it has been with us for some time, and in its more traditional form is simply the debate between those who favor a "cultural pluralism" and those who are advocates of a "cultural monism."

Clearly there is something to be said in favor of each of the alternatives. I shall present each solution as fairly as I can, and then, against this background, I shall formulate a view which seems to me to meet the needs of the present crisis.

II. THE CASE FOR CULTURAL PLURALISM

The cultural pluralist is sensitive to the variety and richness of human culture. He doubts whether any one knows enough to tell other people how to live. He is skeptical of any overall ideology or way of life universally good for all mankind. He does not favor one master-plan in politics, education, religion, and artistic expression.

The plea for such cultural diversity and pluralism has been stated most eloquently by John Collier, speaking at the time as President of the Institute of Ethnic Affairs.[1] According to Mr. Collier, "Racial, ethnic, social diversity, with the interactions of the diversities,

[1] See his article, "The Creative Value of Cultural Diversity," in Trends and Tides, Jan.-Feb., 1946; editor-publisher, Louis Adamic.

is the principal fertilizing and structure-shaping force in human life." As Mr. Collier puts it:

"It is the deep peril and disease of our age, that these differences tend to become flattened out, swallowed up, and annihilated too soon. That is how the machine age operates: and our educational and social philosophies, formed by the machine age, operate that way; and now has come fascism, abroad and here, whose central drive is hatred toward social diversity. The consequences are far more than the denaturing and poisoning of personality here and now. They reach evilly into the illimitable future."

This is an excellent statement. I believe that it may also be said that Mr. Collier's outlook rather faithfully describes the attitude of many of the key figures who work in the various branches of the United Nations Organization -- men and women who have to deal, not with pretty theories of world unity, but with the actual facts of variegated cultures and ideologies. For example, in his annual Report to the United Nations Assembly, Secretary General Trygve Lie argued for a form of cultural pluralism.[2] Concerning the ideological clashes which threaten the world, the Secretary General warned that the world would never accept any single economic system -- communist or capitalist. He held that there are too many forces, too many civilizations, too many cultures in the world to allow domination by any one ideology -- economic, political, or religious.

This is one argument for diversity. A second statement was provided some while back when, at the suggestion of the Director of the Philosophy and Humanistic Studies Division of UNESCO, the present writer sent in some propositions dealing with one possible manner of resolving the clash between the capitalistic and the communistic areas of the globe. My proposals treated the clash of interests as arising out of real differences in the two economic-political systems. The reply of the Director, writing from Paris, was this: "What we are doing here is to assume that to some extent the conflicts are less bad than they appear, or are made to appear worse than they actually are by the use of strong words and the suspicion of bad faith."

This frank statement of policy doubtless represents good strategy as a dialectical procedure. Moreover, the

2 The full text of this Report appears in the "New York Times", August 8, 1948, page 40.

views expressed by these above officials constitutes what is ordinarily described as a "realistic" attitude -- the result of much experience. Therefore one feels constrained to go along with this policy, if one interprets this attitude to mean that *at the present time* the world is too divided to hope for ideological unity on the basis of voluntary agreements. Such unification might be achieved through the use of military force, but no one except a fascist desires to spread the benefits of a "higher culture" through force of arms. The very purpose of the United Nations is to close the door on this type of "unification."

Here, then, is the case for cultural diversity and pluralism. What is the counter-argument of those who favor the cultural monism of a "world civilization" and all it implies? Let us see.

III. THE CASE FOR CULTURAL MONISM

The forms of cultural monism are varied. And the motivations which lead people to advocate some one unique ideology and way of life are different. Frequently such universal patterns of life and thought are described as "totalitarian," since it is desired that they extend to all areas of living and are intended ultimately to regulate the actions of all peoples on earth. The methods for extending these patterns from the smaller area of the "elect" to the other members of the human species will also vary: all the way from peaceful persuasion, economic penetration, religious conquest, to military invasions.

Examples of such exclusive ideologies are provided by the inventors of great systems of philosophy -- from Plato through Hegel to Marx -- the proponents of the great religious faiths -- Mohammedanism, Christianity in its Catholic and Protestant forms, Shintoism, and the like -- and the advocates of political and economic systems, whether these be communism, socialism, capitalism, democracy, and the like.

A study of the foregoing illustrations calls attention to the fact that the ways of thought and patterns of action recommended for universal adoption may be tightly knit internally and aggressive externally or loosely woven internally and unaggressive externally -- or anything in between the extremes.

That some degree of overall patternization is inescapable can be demonstrated by an elementary consideration: the fact that Nazi-Fascism was the only ideology

explicitly excluded from the area of mutual acceptability among the member states of U. N. indicates a degree of limitation of "cultural diversity." And the member nations agree that such a measure of "intolerance" is thoroughly defensible. This moderate form of cultural monism is commonly accepted, and I shall cite several instances of it as providing us with principles to build upon.

My first illustration goes back to the past: During the late war, Dr. Harlow Shapley delivered a radio address in which he pointed out that education and the lack of education played a role in our (then) world-wide troubles. He argued that deficiency in elementary social education had brought the madness of war upon us. In too many parts of the world, Dr. Shapley noted, fundamental education had not been planned so as to teach human beings how to live and let others live in the kind of world that modern technical civilization has given us.

After developing this idea, Dr. Shapley asserted that to achieve these purposes it would be necessary at the earliest possible time to set up an International Office of Education which would act as a clearing house for the dissemination of educational ideals.

The argument for an international office of education was also stated by Dr. Walter Kotschnig in an article on "Toward an IOECD: Some Major Issues Involved."[3] I quote from that article the following passage, which is a statement adopted by the Allied Ministers of Education which met in London:

"To deprive any part of the interdependent world of the cultural resources, human and material, through which its children are trained and its people informed, is to destroy to that extent the common knowledge and the mutual understanding upon which the peace of the world and its security rest."

Such a statement surely implies some measure of overall planning and patterning.

A third example of a similar formulation is provided by the radio address by Arthur Sweetser, at that time Chairman of the United Nations Information Board. In this address,[4] Mr. Sweetser pointed out that an International Social and Economic Council, provided in the Dumbarton Oaks proposals, would play a

[3] Appearing in The Educational Record, July, 1944.

[4] Summarized in the New York Times, Jan. 14, 1945.

vital role in implementing the peace by checking "ills of either a physical or ideological order which may threaten to arise in any part of the world." An interesting feature of Mr. Sweetser's discussion is his recognition of the fact that even in such problems as health, and in industrial and labor problems, which admittedly are the concern of an economic council, questions of human rights are bound to arise. As we now know, this Declaration of the Rights of Man was later formulated by the Economic and Social Council of the United Nations Organization.

These several examples of the earlier and moderate forms of cultural planning, moving in the direction of a cultural monism, are interesting because they bring out the drives -- the "logic of events," one might almost say -- which finally culminated in the creation of UNESCO. Here the ideals we have referred to give promise of some measure of realization. On this level, the cultural "unity of mankind" is hardly anything more than a program of cultural co-operation in which the members strive to make other peoples aware of and sensitive to the achievements and values of their own ethnic groups. Such an attitude of mutual respect is now widely acclaimed. Today, only an extreme nationalism (fascism) would insist that only one culture -- your own -- has value, and that such a culture can learn nothing from others.

But is this enough? Can we stop at this kind of loose co-operation? Is a more positive effort at consciously creating a more inclusive culture required?

It is the thesis of the present book that a more constructive effort at creating a planetary way of life based on a world philosophy is the next step in the onward movement of human history. Such a universal way of life will not suffer from the laissez-faire isolationism of the extreme form of cultural pluralism, nor will it seek to set up a tightly knit ideology and set of institutions such as a "totalitarianism" seeks to impose upon the world. This more integrated culture would be the result of the voluntary collaboration of friendly peoples who, responsive to the logic of events, are willing to commit themselves to this proposition: *We know that our institutions are imperfect and capable of improvement; we realize that our religious faith is but a partial comprehension of a great Unknown Reality; we admit that our legends, folkways, cultural insights, and esthetic achievements are but partial fulfillments of an evolutionary urge to make known the unknown, manifest the unmanifest, create the uncreated; therefore, pooling our insights and achievements, we resolve to co-operate in*

building a universal culture which shall symbolize what MAN, the planetary species, is capable of creating.

Such a commitment also is "realistic." Whatever one may fear or wish, the reality is that some sort of planetary civilization is coming anyway -- that is the alternative to total destruction -- and the important question is how and when will it come -- by intelligent and co-operative planning or by violence, force, or as the insidious byproduct of forms of fascism.

If this view be correct, then, unless we transcend the more divisive forms of cultural regionalism, we will surely destroy mankind in conflicts which have their psychological origins in neoplastic forms of cultural diversity. But it still remains true that the solution to the dilemma is not to destroy or even smudge such differences, but to recognize and accept them as earlier phases of the cultural life-history of an emerging planetary civilization. If we treat them in this manner, it will be possible to absorb cultural diversities into a higher type of universality, a more inclusive unity.

IV. DO WE NEED A WORLD PHILOSOPHY?

The answer to the question, "does mankind need a world philosophy?" can be formulated in the light of practical considerations and also in terms of a theoretical approach. Let us consider the "practical" developments first.

No one denies that the effect of the application of scientific discoveries is to produce a mechanical and technological unification which is wiping out the old boundaries of distance and time. This unification through global technologies is bringing peoples closer together, and this will in turn be accompanied by political and economic integrations. Whether humanity will be better off or worse off because of this togetherness is up to man. Freedom is not something automatically guaranteed by the technological unification of a world society; it is something that must be won as an additional blessing beyond the mere oneness of the world.

Politically, economically, and technologically the world is headed toward more integrated relationships. This means that we shall probably develop ideologically in the same direction. If so, we must even now be thinking of creating a universal ethics which will match (and even guide) the other types of integrations. Creativity in every field has brought us to the point where some sort of collective life is inevitable, but the real

struggle going on in the human race is whether that collectivism is to be achieved under dictatorship of a nation or party, or within a democratic system.

The everlasting bleating about "private enterprise" is as intelligible as talking Sanscrit in New York. Collectivism is an increasing trend in the world, with the communication and mass production systems we have created. We are all going to travel in the same kind of cars, planes, ships, and use the same kinds of refrigerators, electrical devices, and so forth. The very people who are forcing us into a standardized type of living all over the world wherever markets can be found for American and British industrial products, to say nothing of French and other products, are also the people who say that they are exponents of individualism. Such persons are either naive or dishonest. If they anticipate the survival of individualism, it will have to be on a higher level of life, because so far as foods, clothing, housing, transportation, and the like, are concerned we are going further and further into standardization. But that increasing standardization should provide us with the leisure to become individual personalities -- not the "spare parts" of industry -- and so the whole problem of individualism becomes one of education and personal self-evolution. Science and technology have driven us into standardization; now humanism must protect personality from such standardization by elevating the values of life and personality above the purely physical body which can be protected by standardized foods, houses, and so on. The spirit of man must not be standardized. Its unity is in universality, not in political collectivism.

The unity of a universal culture must be sought. The hope of the future is not unification on the *present* educational and cultural levels. Russia is doing that, and her arts are suffering accordingly. The stimulation of contacts with cultures other than our own is so important that we must encourage diversity of expression of creativity. Someone has said that the brotherhood of man is not based on a collectivism of people who think alike, but on a democracy of persons who think differently while having common objectives. This is an excellent statement; but it must not be overlooked that these "common objectives" are themselves established by cooperative thinking. In short, just as air lanes and communications are global, and ether waves know no boundaries, so our spiritual perspectives must expand to a parallel vision of planetary unity.

This brings us to one of the serious problems of our times: the exploitation of primitive peoples and the

destruction of their local cultures in order to find sources of raw materials and provide markets for the products of industrialized societies. The cultural intrusions accompanying the impact of industrial societies on non-industrual societies can only be controlled by broad programs of co-operation which aim to protect the social rights of all human beings everywhere. I therefore repeat: *rather than a world cultural plan being incompatible with the protection of diverse cultural values, such a plan is the only serious guarantee of such protection.*

At the same time that these plans for cultural co-operation on a world level are going forward, there must also, within the already industrialized societies, be a program of education to restore the arts and the "humanities" as a means for realizing a richer life -- and that is something more than an education devised for merely industrial and financial pursuits. The values of the humanities are to be found in their ability to foster a humane society, to help us evaluate, and give us power to interpret, and put our thoughts into deeds. Education should not foster arid intellectualism or sterile classicism; it should produce citizens who can think compassionately and feel intelligently, not only in relation to their own small community but also in relation to a world community of friendly peoples. History as the record of the past is of value if it enables us to recreate imaginatively the experiences of men the world over and thus prepare us for achieving universality in the spirit of man.

Quite obviously, this implies that we should move in the direction of a loyalty that rises above selfish nationalism, exclusive partisanship, class and race prejudices, and narrow ideologies. Loyalty to mankind must become the central motif of the new society. In the past, morality has been a matter of latitude, longitude, and altitude, varying with time and place the world round. In the future we will need to correct this and voluntarily strive to create a more universal culture based on the principle of an organic society, that injury to the least part is harm to the social whole.

This is the answer based largely on the necessities of a "practical" sort -- i.e., what science and technology are doing to our society and what we must do in turn to humanize man's standardized world. Next, in order to develop the argument from a theoretical angle, I shall start with a criticism of this view, and then use this criticism as my point of departure.

V. DIFFICULTIES CONFRONTING A WORLD PHILOSOPHY

One critic of the foregoing view has written me as follows: We live in a world of sovereign states with diverse political, economic, and religious faiths. Any kind of effective international action, for some time to come, must take place through these sovereignties and within the possibilities of the harmonious interactions of these faiths. A new World Philosophy, such as you advocate, would thus have something of the status of another competitor among Marxism, capitalistic democracy, fascism (still very much alive), Catholicism, and so on. There is certainly nothing wrong with adding a competitor, but then one must face the whole problem: how, in practice, does a World Philosophy take root and grow into a living instrument? What relation must it have to economic interests and existing cultural traditions? How could this philosophy expand in relation to the actual complex of political sovereignties? Put concretely, must one not clarify in realistic terms the connection of a "world philosophy" with UNESCO, and the "East-West tension"? It could hardly take root and grow *apart* from these forces and agencies, or *against* them (they would isolate and destroy it), but somehow it would have to intertwine among and work within them.

Among the problems raised by the foregoing analysis, two stand out as deserving of closer scrutiny: (1) how can you create such a world philosophy?; and (2) how can you insert it into the social complex and get it to flourish? Actually, these two problems are one in the present view, and the fact that some persons will think of them as separate questions is significant as indicating at the very outset a misconception of what is meant by a "world philosophy."

Of course, one might also ask, How did Platonism get started? Or Stoicism? Or medieval Scholasticism? Or Utilitarianism? Or Existentialism? The answer is that in some cases the founders started schools to spread their teachings: thus Plato had his Academy; Aristotle founded his Lyceum; the Stoic taught from a porch; and the medieval Scholastics founded some of our great universities.

VI. UNESCO AS THE HOME OF A WORLD UNIVERSITY

In the past, the founders of great systems of philosophy were frequently connected with individual institutions. We now realize that the inventors of such systems gave

us formulations that were too highly individualistic or elementalistic to achieve universality, even when they aimed at it. We also know that solitary institutions today, even our great universities, are too departmentalized to undertake the job of putting our knowledge together into a synthesis of physical science, the arts and humanities, the social studies and the science of religions. Moreover, the teachers in our universities do not have the leisure, the facilities, or the definite social obligation to undertake the work of creative synthesis.

We need a world institute, a World University, presumably set up by UNESCO, where it will be possible to bring the scholars and creative figures in all fields together. Here these outstanding individuals would be given the time, facilities, and obligation to work out a progressively expanding synthesis. In brief, a world philosophy must not be the philosophy evolved by any one master mind; it will represent the collective product of the best minds drawn from all parts of the world -- East and West -- who have labored together to produce the modern synthesis. If this could be done under the aegis of UNESCO, we would have the answer to the question raised by the critic who thinks of "world philosophy" as a "rival" which seeks to grow *apart from* or *against* the existing ideologies. In a World University scholars representing all countries, and at the outset all "schools" of thought -- creative figures from Russia, the democracies, the existentialist and scholastic movements, and the like -- would come together in a spirit of humility (not as arrogant possessors of final truth) and seek for the great common foundation on which to build a world civilization. This would indeed be the consummation of one of the world's great "traditions."

VII. THE GREAT TRADITION: UNIVERSAL KNOWLEDGE

The point has been made that cultural diversities are related to historical backgrounds and traditions. But tradition is something that must be criticized, sifted, and sometimes modified. For example, the white race and the dark race, living in the United States, need to rise above (but not forget) the historical circumstance, that negroes were once slaves. In general, all victims of discriminations need somehow to transcend or sublimate (but not wipe out) the memories of the experiences connected with slavery or other forms of discrimination between "first" and "second" class human beings. We see,

therefore, that tradition is not sacred or infallible.

Moreover, in the plea for cultural diversity as it grows out of immemorial experience and represents the flowering of history, legend, and myth, it must not be forgotten that there are traditions and traditions, not always harmonious and consistent, even within the same ethnic group. In the cultural heritage of the Western World there is the tradition of Greek philosophy -- the dream of Pythagoras and Plato, with its goal of rationalism, scientific and political. To abandon the hope of a world philosophy is therefore to surrender the noblest tradition we have inherited from the Greeks: the ideal of a human life and a society that has been examined and refashioned in the light of human intelligence.

If Mr. Trygve Lie's statement (previously referred to) is interpreted to mean that an agreement on a common ideology is forever impossible, it means that there can never be any real hope of convergence toward common (universal) institutions and ways of life and thought on this earth. But such a view denies any future for social science, for science means knowledge that is universally valid, publicly verifiable. Such an interpretation (which surely Mr. Lie did not intend) would destroy the faith and vision of such great figures as Socrates, Confucius, Buddha, Jesus, Spinoza, Whitehead, and all the other founders of great systems which aimed at universally valid wisdom.

It is even a betrayal of pragmatism as a philosophy which denies the possibility of timeless, absolute, universal truth; for assuredly William James and John Dewey recommended pragmatism as a common method -- a scientific method -- for solving human problems. And clearly it is a presupposition of scientific method that if similar human organisms start with the same data and reason about this common body of material by means of the same scientific methods, they will arrive at similar results in the form of verifiable knowledge. So even relativism promises a kind of ever-evolving universality.

Here, then, we come to grips with the theoretical basis for a belief in the possibility of a world philosophy. And this will give us the specific answer to the second question posed by the critic.

The great principle that Socrates formulated when confronted with the proposition that man is the measure of all things is that it is not the individual man who eats, drinks, and sleeps, but the universal man -- "planetary man," in our terminology. The man whose judgment has validity is not the "man" of the Sophists, the man who can find nothing more than opinion and

expediency as the norm and guide to action. Socrates gave the problem of the nature of truth a definitive statement when he reexamined the problem of the nature of truth and the nature of the human mind as its organ of discovery.

As Thomas Davidson has pointed out in his book, *The Education of the Greek People,* the most fundamental questions the human mind can ask are these: (1) What are the conditions for the formation of true conceptions? and (2) What must be the nature of the world of reality that possesses these conditions? Philosophy has no more important task than to answer these questions.

The great contribution of Socrates to what turned out to be the culture of the Western world is the fundamental idea that truth, to deserve the name, must be true for everybody and not depend upon individual peculiarities. The conclusion is that men think differently only because they think imperfectly, superficially, one-sidedly, and do not see the full meaning of their thoughts. But in order that complete thoughts can be the same for everyone -- as the Socratic method implies -- it is necessary to assume that all intelligences are in some way comparable; they can have a common content because there is a common (universal) intelligence which is the source of all truth and which provides the basis for the social bond of understanding.

This doctrine of an objective truth rests on a faith, but this "faith" is an expectation based on experience. It would not be possible here to validate the philosophical theory necessary to justify the proposition that men think differently because they think one-sidedly, so that if they thought out their ideas completely there would be one truth for all to attain. I shall not now attempt to prove that proposition -- anyway, this has already been attempted in my book, *World Philosophy: A Search for Synthesis.* I must content myself with pointing out, on the basis of what science is attempting to do and on the basis of the measurable success that has already attended these efforts, that there must be a theory of man and of nature in terms of which science can discover laws of astronomy, physics, biology, and so forth, and it is therefore reasonable to hope that similar success will mark the progress of the social sciences as they grow and mature.

And so we say to the sceptics: it is the faith of the "great tradition" in philosophy that the world may yet discover an ideology good for all mankind, and this world philosophy will provide the social synthesis which we must have if war, destruction, and chaos are to be

forfended. Such an ideology is implicitly wrapped up in both "democracy" and "scientific method," and it is man's supreme job to get it out or exfoliate it. This will be "operational research" on a large scale.

VIII. THE FUNCTION OF THE ARTS AND RELIGION IN A WORLD CIVILIZATION

The preceding emphasis on the humanities and the social sciences in the fabrication of a pattern of cultural universality will not in the least interfere with the work of artists who are enriching our culture through music, poetry, drama, painting, and the other arts.

Indeed, the theory presented here envisions a considerable expansion of the artistic and esthetic impulses and activities as a counterbalance to the mechanical standardization produced by the industrial society. The one place where cultural co-operation is possible with a minimum of friction due to "cultural diversity" is in the field of the fine arts. But here, again, we will need to rethink the problems of the nature and functions of art in society. The following theses are the principles which seem to me to harmonize with the general background of a World Philosophy as we have pictured it:

1. - Art is neither an embellishment on life nor an escape from it. The esthetic qualities characterize all *vital* experience and condition all *effective* everyday life.

2. - The forms of art are not themselves to be treated as eternal essences; such forms and expressions are relative to time, place, and human circumstance. The stuff of the arts is composed of varied experiences with the natural, human, and social environments.

3. - Art is not an independent, absolute value, but a cultural instrumentality most important for the complementary functions of (a) creative self-evolution, and (b) communication and social participation.

4. - Art, both as process and product, far from being a high-brow luxury or a dispensable frill, is an organic part of public life and morally responsible social planning.

5. - Art for the traditional European peasant-court-ecclesiastical frame of reference cannot be completely adequate in serving the needs of an equalitarian, pioneering, democratic people.

6. - Art for an earlier agrarian life cannot completely serve the needs of a science-conditioned, urban-industrial culture.

7. - Adequate democratic planning, far from regimenting the artist, affirms the individual's cultural integrity by assuring him of a fertile soil in which esthetic achievements and values may flourish.

If we follow up the implications of these principles, it will appear, I believe, that the artist comes nearest the approximation of the good life, perhaps mainly because the creative artist gives freely of that which he creates and seeks to communicate to others.

In the field of religion, however, the situation is somewhat different. Perhaps it is because of the claims to eternal truth, once and for all time revealed to man, that religions of the authoritative sort have become encased in impenetrable suits of armor, and like the knights of old, go forth to do battle with the dragons of unbelief, infidelity, and false doctrines generally.

And so, today, we find the great rival religions lined up against each other, their weapons no longer those of former times, but none the less potent, even though they are the instruments of education, propaganda, and what is now called power politics. In the present book we are concerned with this great religious problem. Here we present pantheism as the solvent of our impending religious conflicts. But labels are not so important as the ideas behind them. What is important is that we realize the need for unification. Synthesis must become the great magnet which orients us all. We need a new confidence that there is sound hope for a synthesis of science and religion that can be reached by co-ordinating our efforts at attaining a broad view of the ongoing processes in nature, man, and society. This, it seems to me, is the next big job for the enlightened peoples of the world.

CHAPTER II

RELIGION AND SCIENCE IN CONFLICT

I. THE MEANING OF RELIGION

The problem of the nature of religion and its relations to philosophy and science can profitably be discussed only in the light of one's definition of "religion." If one employs a narrow definition, then religion,

especially in its organized or institutionalized forms, may have little future; but by a broader definition, religion may have a future as bright as that of the human race.

As an example of the use of the broader definition, we think of the effort of Professor H. R. Mussey to show that Russian Communism, especially in its first decade, fulfilled the requirements of a religion. Similarly, Harry Emerson Fosdick once declared that Nazism is (was) a religion, though a bad one. Using a broad definition, it is possible to show that as long as men earnestly believe anything, religion will remain a fact of society. By carrying this procedure further, one can also prove that science itself can be the religion of the devoted scientist. The historical fact that the term "atheist" was first applied by the Romans to the Christians (Lucian slurringly puts Epicureans, atheists, and Christians into one class), only in turn to be applied later on by the Christians to the atheistic unbelievers in the God of Christianity, confirms this broad use of the term, i.e., its possible dissociation from theism.

It is true that this inclusive meaning of the term violates those popular definitions of religion which associate it with a necessary belief in a god (monotheism) or in many gods (polytheism). However, the *New Century Dictionary* defines religion as the "recognition on the part of man of a controlling, superhuman power entitled to reverence and worship." If this "superhuman power" is not limited to a personalized (anthropomorphic) entity, but is broad enough to include the more abstractly conceived realities such as the universal lawfulness of nature of the pantheists and the "infinite eternal energy" of Herbert Spencer, then there is no difficulty in accepting the *New Century Dictionary* definition. This dictionary meaning fits in with the broad interpretation and does no violence to semantic principles.

II. FREEDOM FROM DOGMA

If religion is conceived in this broad manner as passionate devotion to something in the universe which arouses in man the sense of awe and reverence, *but at the same time is freed from the creeds and dogmas of the churches,* then the so-called conflicts between science and religion are in reality only conflicts between narrow church doctrines (theologies) and the accepted truths of science in any given period.

That such a conception of religion is a legitimate one, we have already sought to establish. That it is the only conception of religion which is justifiable, is what we propose next to demonstrate. Only by returning religion to this broad, pliable, and viable form is it possible to foresee in an increasingly scientific world any hope or future for religion.

If religion cannot free itself from these man-made and historically dated theological conceptions (creeds), then religion deserves to disappear. If religion finds itself unable to approach the pantheism of the Stoics, Spinoza, and Emerson, then the last chapter of the history of the warfare between the orthodoxy of organized religion and the teachings of science has not been written, and to such books as J. W. Draper's *History of the Conflict Between Religion and Science* and A. D. White's *History of the Warfare of Science With Theology in Christendom* other volumes will have to be added to complete the unfinished story.

To show that these reflections on institutionalized religion are not inappropriate, consider the dangers inherent in organized religion.

III. TENDENCIES OF ORGANIZED RELIGION

An objective study of the problem of religion in our world may properly begin with the observation of a curious fact: all the great monotheistic religions of the world predicate the existence of one supreme, all-inclusive, omnipotent god which is called by many names, Brahma, Allah, Jehovah, First Cause, Prime Mover, and many more. Even the primitive mind seems at times to have grasped the hypothesis that an integrated universe must be the work of one cosmic being.

Yet never in the history of any of these faiths have the official priesthoods been able to find any common grounds for worship or to agree upon a statement focused on the one God. The one, cosmic, omnipotent God apparently has never been able to impress the collective human mind with the same conception of his nature. It is the record of history that the imprint of the Creator of the cosmos has varied widely from age to age, from race to race, from religion to religion, and that climate, economic conditions, and geography have contributed to the concept of God developed by even the most earnest and pious of men. The scientific investigator, observing this piece of evidence, asks why, if God as a personality deals directly with men, revealing himself to and speaking

the language of man, he has not been able to reveal a more uniform and integrated history of himself to his "images."

To the objective investigator it becomes evident that, rather than proving that man is made in the image of God, the history of religion proves that God is made in the image of man. The study of the evolution of the idea of God is a legitimate and reverent task to be laid upon the honest investigator, for the evolution of God in human consciousness parallels step by step, line upon line, precept upon precept, the evolution of man. For God, as conceived by man, can never be more than the essence of the highest concepts achieved by man, the idealized image of his own hopes and aspirations. Yet none of the religions has yet recognized that the well-informed, sensitive, searching mind of man is the best indication of man's spirituality. Man's conception of the Ultimate Reality is a symbol of the point in evolution achieved by man, a token of his vision and expanding consciousness.

The most important thing, perhaps, to the scientific investigator about this Ultimate Reality, this uncreated Cause which man is so constantly trying to visualize and symbolize, is its cosmic magnetism in drawing and holding to it the finest and the highest faculty that men possess throughout the ages and among all races of men. The incalculable significance of "God" is not to be found in the forms created to communicate the idea of God, but in the inference that there exists a power so universal, so potent, so all-absorbing that the pursuit of disciplines leading to an experience of that power has developed an element in human life which has become one of the dominating principles of all societies. We may say that our forms of government, our forms of education, and our forms of religion constitute the great triumvirate of contemporary society. Some of the most powerful institutions on the face of the earth are religious institutions. Even the great Russian experiment, which attempted to suppress religion as a social institution, has now given way before customs and impulses which cannot be uprooted from a humanity in whom the instinct to survive, the instinct to reproduce, and the instinct to worship the unknown source of all life are of equal strength and validity.

The instinct to survive and the instinct to reproduce we share with the world of animate nature. The instinct to worship the supposed source of all life has given rise to much that has made us human. Worship and

curiosity, faith and adventure, belief and experiment -- these have given us everything we have of the arts, sciences, religions, philosophies, and governments. Even the agnostic must recognize that every piece of creative work begins as an act of faith. Deeply embedded in man is the conviction that his most tenuous insights can somehow, in some way, be given forms by which they can be communicated, even though the communication be inadequate, incomplete, and unsatisfying. The evolutionary urge in man convinces him that his role is forever that of trying to manifest the unmanifest, to make known the unknown, to create the uncreated.

IV. THE SYMBOL CONFINED

Man, the creator of the symbols of God, should know beyond all doubt that the image he creates, the idea he embodies, is partial, temporary, transitional. It is those persons who substitute the symbol for reality -- who do not possess the disciplined powers of insight -- who are content to spend their instinct for worship in the passive acceptance of the reports of others, who evade the responsibility for direct experience. They deify the symbol, fence it in with separative ritual and legend, and are incapable of recognizing the parallel symbols produced by others, in other lands or in other ages. It is the uncreative who deny the existence of a state of being still to be revealed, of cosmic levels still to be attained by unremitting evolutionary advance. It is the uncreative, the passive, who in their littleness attempt to delimit their God, to confine the images of ultimate reality within the grasp of their own weakness.

It is the uncreative who insist upon rigid theologies and lifeless orthodoxies; it is they who believe that the fountain of inspiration has dried up, and who cling fanatically to the relics of past spiritual vitality because of their own impotence to continue the creative pursuit of understanding. Religion, if it is to be faithful to its own best possibilities, must be an eternal search for truth, as selfless, as devoted, as disciplined as the research of the physicist, the mathematician, the biologist, or any other worker in the creative fields.

V. A STATIC THEOLOGY

A static theology in a dynamic world is a booby trap for the helpless. For when theology becomes a fossil of

what once embodied the life of a spiritual movement, it seeks to impede those whose creative insights might challenge the authority of the theology. The interest of the orthodox religious institution is in a fixed and unalterable way of procedure. To admit a theology to be a moving, growing, organic body of knowledge would be to unsettle the institution that has grown up around the theology. A creative evolutionary development would be a disruptive influence in the history of a static religious organization. So theology resists change, resists the activities of the creative mind, in a word, denies the existence of a dynamic God working in nature -- and preaches the existence of an "absentee landlord" of the universe who long ago ceased to reveal himself in the processes of evolution.

This is the concept of God nourished by many of the theologians in the great organized religions of the world. It has always been the story of religion. It is for this reason that the coming of a new Teacher, the incarnation of a new Word in human history, has always had to face the persecution of the community out of which the Teacher and the Word emerge. Where is the history of a religion that has welcomed the revolutionary insights of one of its followers? Where is the religious institution that will willingly recondition itself in the light of the teachings of the illuminati?

The only dynamic mysticism that can be found today is a scientific mysticism, the insight and enlightenment of men and women working not in temples but in research laboratories and in studios and libraries. The development of those arts, sciences, and letters which are pouring out enlightened concepts upon the world of men is due to the plasticity of the disciplines in which the research is done. If physics had a dogmatic creed, Einstein would have been driven underground by the dogmatists, and the men and women who created the background for the formulas of atomic energy would have been persecuted and discredited.

To relieve this discussion of its abstractness, we shall refer to several instances of the tendency of organized religion to encase itself in an armor impervious to change.

VI. EXAMPLES OF THE CONFLICT

The case of Galileo is a notable example of the so-called conflict of science and religion. In vain did Galileo try to show that the old Ptolemaic, earthcentered

system of astronomy was inadequate and should be replaced by the Copernican, heliocentric cosmology, for in solemn congregation assembled the theologians declared:

The doctrine that the earth is neither the center of the universe nor immovable, but moves evenly with daily rotation, is absurd, and both philosophically and theologically false, and at least an error of faith.

As is well known, Galileo recanted and renounced his heresy; but Giordano Bruno, who refused to renounce the Copernican cosmology, was burned at the stake in Rome in 1600 for his heresy. As late as 1819 the books of Galileo, Copernicus, and Kepler were still on the index of forbidden books, and it was not until 1822 that a decree was issued permitting the teaching of the motion of the earth about the sun.

This example is from the annals of the Roman Catholic Church. But the views of Martin Luther, and of the Protestant Reformation in so far as Luther guided it, did not differ from those of Catholicism on this point. Luther was no more sympathetic to the newly developing sciences than the medieval Aristotelianism of the Scholastic theologians.

And in the orthodox Jewish tradition there was no greater freedom for criticism or reform. The case of Spinoza may be cited here. The formula used by the heads of the Ecclesiastical Council for the excommunication of Spinoza contains the following lines:

With the judgment of the angels and the sentence of the saints, we anathematize, execrate, curse, and cast out Baruch de Espinoza, the whole of the sacred community assenting, in presence of the sacred books with the 613 precepts written therein, pronouncing against him the malediction wherewith Elisha cursed the children, and all the maledictions written in the Book of the Law. Let him be accursed by day, and accursed by night; let him be accursed in his rising up; accursed in going out and accursed in coming in. May the Lord never more pardon or acknowledge him; may the wrath and displeasure of the Lord burn henceforth against this man, and blot out his name from under the sky ....

This anathema (quoted only in part) might be excused on the ground that the leaders of the synagogue felt they owed a debt of gratitude to their hosts in Holland for the welcome extended the Jews, so recently exiled from Spain, and accordingly they were forced to condemn

a man whose views struck at the Christian doctrine as forcefully as they struck at Judaism.

VII. ORGANIZED RELIGION AND EVOLUTION

The next great example of the conflict between science and religion was provided by the reaction of the churches to Darwin's theory of evolution. The reverberations of this conflict have not completely died down; indeed, the problem of the implications of evolution for science, religion, and philosophy has not yet been solved. And when this idea of evolution is carried into the field of religion itself, the battle that subsided after the Tennessee trial flares up again in even more violent form.

The idea of a continuously evolving body of religious insight shocks the orthodox mind. Organized religion has never seriously attempted to integrate the idea of evolution -- biological evolution, mental evolution, and social evolution -- into the core of its thinking. It has pinned the theory of evolution insecurely onto its garment of theology; but it has seldom examined what might be inferred from the evolution of religion.

This well-established idea that religion should be static -- in a dynamic universe -- explains why we have so much churchianity and so little Christianity, so much administration and so little inspiration. The great church campaigns today are campaigns to raise money -- to bring people "back to the church." If the churches had vision, in either a mystical or a scientific sense, the people would go "forward" to the churches, not back to them. But the churches today are as lacking in mystical experience as they are in scientific knowledge.

What is the solution to the problems of institutionalized religion? What can be done to reform the churches from within? How can organized religions be made to realize that the nature of a dynamic and evolutionary universe cannot be taught in the symbols of a pre-evolutionary mode of thinking?

Anyone attempting to indicate to the churches what organized religion can do to revitalize itself is undertaking a rather thankless task. And yet one must speak the truth as one sees it. Moreover, there is always the hope of encouraging those religious organizations which have enough plasticity to adjust themselves to new ideas. It may even be possible to create new religious institutions (for example, humanist churches and ethical culture societies) which will take their nourishment directly

from the progressing scientific revelations that pour out in an endless stream.

Let us develop this thought.

VIII. RELIGIOUS HUMANISM

The scientist who regards these problems as unimportant, or who in an age of science refers the problems of religion to the churches, is shirking his full duty. The whole difficulty of our society boils down to the lack of certain moral qualities in modern man that renders him incapable of closing the gap between his knowledge and ideals and his existing institutions and organizations. We demonstrate infidelity to truth and lack of courage, stemming from the failure of our education and our religion and our arts to create values which are worth sacrificing to attain.

A futile religion contributes to the frustration of society, for it stifles moral creativity. We are teetering at the edge of an abyss, and we realize hazily that the status quo cannot long be maintained. Unless we align our ideals and our social institutions, Tagore's vision in *Manassi* will move on to its dismal climax. The one great hope for avoiding catastrophe is to proliferate a dynamic, creative democracy. This implies the development of a nonsupernaturalistic religion, which may well be called the "Religion of the Scientist in the Atomic Age." The postulates of this new approach may be stated as follows.

IX. POSTULATES OF A SCIENTIFIC-RELIGIOUS HUMANISM

1. There is a universal guiding field of influence, closer in nature to the cosmic fire (intelligent energy) of the Stoics than to the Creator in the orthodox interpretation of Genesis, which gives coherent form to the evolving realities in space and time.

2. Human consciousness, in its awareness, its time-spanning properties, and its purposiveness, is an expression or epitome of this cosmic energy (or form-producing field).

3. The only knowledge man has is human knowledge, and no ultimate truth can come into his range of understanding greater than the capacity of the human mind to recognize and utilize in a given age. There are no revealed religions containing final and absolute truth.

4. The evolution of science, religion, and philosophy is the expression of man's efforts to apprehend this larger cosmic field of influence. Therefore the only "true" religion is the one that encourages this continual creativity of man in his search through science, the arts, philosophy, and religion for means of expressing his highest insights into the meaning of the evolution of life on earth and the development of mind in society.

Such a religion would be free from the most important single criticism we have aimed at the institutionalized religions of the world, Occidental and Oriental -- that they no longer have any place within their scheme of things for the mystic and his faculties of direct experience. Paradoxically, every religion claims to have been founded upon mystical insights; yet today each religion denies the validity of such insights in modern man. The precariousness of the churches in the United States comes from this now irreconcilable duality of attitudes: the effort of the organized religions to maintain their authority, which arose primarily because of the direct cognition of some Teacher, while at the same time encasing themselves in an armored mechanism borrowed from earlier scientific attitudes which denied the spiritual nature of man and the possibility of any insights into a subjective world of authentic values.

Theologians therefore are hopelessly trying to maintain an outer appearance of competence while struggling to balance the influences of an antique mysticism and an outmoded mechanism. The fabulous mysticism which is legendary within a religion must give way to the concept of a trained and scientific mysticism which has created our contemporary scientific world picture, a picture which has brought physics and metaphysics to a more than nodding acquaintance. Creative thinkers must no longer be crippled by the very institutions to which they have given their loyalty.

The religious spirit in man must be rescued from the vast cathedral tombs in which it is interred. Someone has said that Christ is entombed in the churches and must "rise" from them and seek recognition elsewhere. Certainly the Buddha has been entombed in modern Buddhism, Confucius in Confucianism, and Lao-tzu in Taoism. One cannot easily imagine Christ entering into the life of the many institutions which exist in his name, without shattering their forms and convulsing their priesthoods with fear and angry resentment. The farther theology moves from the simplicity and insight of the creative mystic, the more rigid and materialistic the church becomes. If there is any one element which should dis—

tinguish a religious body, it is the element of creativity. Yet creativity today is nourished and cultivated not within religions as they now exist, but in the arts and the sciences.

X. THE DIVINITY IN MAN

In the long course of social evolution man has sanctified many things as the source of ultimate power, the object of veneration and worship; but he has not touched upon man's essential divinity. Never have we identified the creative force, the divinity in man. Yet if there is one thing the Christian mystery sought to teach, it was the divinity within man, unrecognized, undeveloped, unheeded. By this creative quality of his mental life man can transcend his biological nature and then -- consciously, voluntarily, morally -- he can redirect the course of nature in conformity with selected ends of his own choosing.

In the past man has created many gods, all of them regional, racial, or class conceived. So we have had black gods and white gods, brown gods and yellow gods, because human imagination was incapable of overleaping its traditions and its ethnocentric limitations. Yet back of his groping intellect was sometimes an urge toward the idea of an as yet unknown god, and ultimately men have come to conceive of a god great enough to cover all mankind. The trouble has been that men have projected this universal god into the external world and have failed to see that it is the godlike in man which leads him to externalize and objectify his own inner aspirations and conceptions. For the god idealized by man is the object of his own creation. And this man-conceived being can never be greater than the creative power of man to imagine.

Historical religions have deified the symbols of the gods they have imagined. Idolatry is the worship of these socially stabilized *symbols*. We here propose to deify the creative *process* in man which enables him to give form to these images which he projects into the outer world. There is (we postulate) an objective form-producing field of influence which corresponds to man's conception of an extrahuman god -- *but, until this cosmic guiding field reaches up into human consciousness to appear as an integrated human personality, this is a nonmoral force.* Humanism, religious and scientific, is iconoclastic in breaking the *images* (social symbols) of the traditional gods and setting up *processes* in their

places. Such a humanism would abolish the distinction between the sacred and the secular, not by killing the sense of reverence, but by taking the sacred out of the hands of authoritarian religions.

For scientific humanism, "divinity" is not a "thing" -- it is an aspiration toward wholeness. The "god" in humanity is simply this upward striving effort of man to become something more than what man now is. Man's endless capacity for self-evolution is not only the most interesting characteristic of the human being, but it is the most arresting fact in the universe.

Today man's conception of man is undergoing a major change. Out of the flux of ideas, the new and archetypal concept of man will emerge to shape the coming culture, which must continue to provide for man's self-evolutionary development toward new freedoms. If the organized religions are able to forget their old theologies and adjust themselves to this new trend in human evolution, they may yet make a contribution to the forward movement toward a world civilization.

CHAPTER III

SCIENCE, DEMOCRACY, AND VALUES

I. SCIENCE AND POLITICS

It will be remembered that after the close of the last war, when the U. S. Congress had for its consideration the problem of framing legislation for the control and development of atomic energy in this country, Senate hearings were initiated to obtain the information necessary to the writing of a satisfactory bill. Part of the self-imposed education which the Senate Committee underwent consisted in a rapid survey course in nuclear physics at the hands of atomic scientists. In the course of the hearings on this complicated subject, at a point where science and politics became tangled up, one of the exasperated senators exclaimed to the physicist: "You scientists got us into this mess; now show us how to get out of it." The reply of the atomic physicist was: "Oh no! You politicians got us into this mess!"

This episode points up the whole problem of the place of science in society. A satisfactory solution to the

problem should give us the answer to the question of whether the scientist or the politician is right -- or whether both are wrong -- in the above dispute. I know of no more interesting question from a theoretical point of view, and it appears that there is before us today no more significant problem in terms of practical considerations.

In order to make it easier to find our way through this wilderness of issues, let me state precisely, and at the very outset, what I hope to prove in this chapter. Briefly, what I shall try to establish is this: *The aims of science and the aims of all rational, intelligent living are one and the same.*

Contrary to the views of those who hold that the problems of value lie outside the field of scientific method, I seek to show that there is no opposition between "facts" and "values," no barrier separating the goals of science from the goals of broader human aspiration. Contrary to those who argue that science cannot give us the answer to questions involving choice of ends, I hope to demonstrate that science does provide us with what is required to find the answers. In defending this thesis, I am going contrary to a widely accepted view; but I take this course deliberately, after giving the matter considerable thought.

We come, then, directly to the questions: *What are the aims of science? What are the "larger" aims of life? How are these two sets of aims related? And do the "larger values of life" lie outside the scope of scientific methods?*

II. SCIENCE AND LIFE

The manner in which the subject is stated suggests that science and human life are not coextensive. Those individuals who believe in what is called the "ethical neutrality" of science hold that the aims of science do not include all the values and goals of human living. Among those who subscribe to this view we find the distinguished British philosopher Bertrand Russell, who has explicitly stated that the field of values is closed to science.

According to this view, we cannot deal with human desires, hopes, fears, and aspiration, in a rational manner. Logic and reason are splendid in their own proper spheres, it will be said, but life is bigger than logic.

This means that problems of personal choice -- for example, whether to fall in love -- and problems of

social decisions -- for example, do we need a national compulsory health program? Or planned parenthood? or world government? -- these questions fall outside the province of science. If this is so, the answers to such questions cannot be discovered through the application of scientific methods.

Now I do not myself subscribe to this theory of two worlds, a world of scientific interests and a world of extra-scientific activities. But before stating the reasons why this fragmentation of living seems objectionable, it is necessary to outline the reasons why able thinkers have held to this doctrine. This brings us to the division of the world into two separate domains, the world of facts and the world of values.

III. THE DUALISM OF FACTS AND VALUES

As commonly defined, the world of facts has to do with *what is,* while the kingdom of values is concerned with *what ought to be;* and after the same pattern, *descriptive science* investigates the complex of facts in the universe of space and time, while *normative science* investigates the ideals and values which are the objects of human desires.

Apparently the principal motive for setting up the dualism of facts and values comes out of the recognition that things are not always as we would like them to be; and also the recognition that science by its nature is objective, impartial, unbiased -- free from prejudice and propaganda. In the light of this distinction, it will be pointed out, for example, that whether we can or cannot build a rocket ship to go to the moon is a problem for science and engineering, requiring for its solution a knowledge of the facts and laws of physical science. But whether it is desirable for man to try to go to the moon is a problem of values, and science, since it gives us knowledge about *means* but not of *ends,* cannot answer that question. Again, if we want sterilization laws, or euthanasia, or compulsory vaccination, or birth control, we can secure the factual information on how to accomplish these things from the sciences of biology and medicine. But whether these goals are desirable is not a matter for science to settle, since this involves preferences, ideals and values -- matters on which scientific method has nothing to say.

Those who hold to this dualism are committed to a kind of schizophrenic surgery of human nature into the

"scientist as scientist" versus the "scientist as citizen." The scientist as scientist cannot tell you whether we need any of the above proposed reforms; but as a citizen of the state he has a duty to work out what he thinks is the corrent stand on controversial social issues.

This view has been clearly set forth and approved by Dr. George A. Lundberg, well-known sociologist, in his book, *Can Science Save Us?*, and I recommend this volume as an able and honest statement of that point of view. For the sake of brevity, I shall call this schizophrenic theory the *half-a-man theory of science*. Now I state the reasons why I cannot go along with this theory of the nature of science.

IV. THE DEFECTS OF THE HALF-A-MAN THEORY OF SCIENCE

The main reasons for rejecting the dualistic theory are:

(a) It has harmful social consequences;

(b) It is psychologically unsound.

Let us consider these objections more carefully.

One of the implications of this theory of *facts versus values, science versus emotions,* is that when we put the issue in this fashion science has nothing within its nature or scope for determining what are the proper or moral uses of scientific knowledge. This would mean that the scientist who discovers how to make TNT, or plutonium, or any other potentially beneficial or harmful product, has in principle no social control of the uses to which his contribution will be put. As a scientist, he places his brain at the disposal of a corporation, institution, or state, and this organization may be greedy or sadistic, but whether the applications of the discoveries of that brain are good or bad the scientist as scientist knows nothing about. Nobel, the peace maker, may try to undo the effects of the discoveries of Nobel, the TNT maker; but if he does exert this effort, it is because he is now something more than a scientist -- he is a full human being!

If one of the motives for this so-called objectivity or ethical neutrality of science is the desire to free the scientist from the temptation of engaging in partisan causes or propaganda for his particular ideology, the inescapable consequence is that for science one kind of state and political party and economic system is just as good (or just as bad) as any other kind.

Many scientists evidently have failed to see this or

have refused to recognize it as a consequence of science's separation from problems of value and social choices. But one who has accepted this implication frankly and consistently is Dr. Lundberg, the sociologist to whom we have already made reference. Professor Lundberg states (*Ibid,* page 45): "Finally, the advancement of the social sciences will cost the abandonment not only of the *individual concepts* carried with us from prescientific times, it will require us also to abandon deeply cherished *ideologies,* resembling in form, if not in content, their theological predecessors....Scientists must recognize that democracy, for all its virtues, is only one of the possible types of organization under which men have lived and achieved civilization....The historical fact is that science has gone forward under a great variety of forms of government, and conversely, at other times, has been suppressed and frustrated by each of the same types, including democracy....My attachment to democracy may be, in fact, of *scientific* significance chiefly as indicating my unfitness to live in a changing world."

This idea that science can "go forward" in a fascist state means, of course, that a physicist who lives and works in a Nazi state can produce results as good as he could have achieved if he had worked in a democratic society; that a biologist working in Russia today can be as good a scientist as he would be in a democratic society (though Dr. Lundberg's statement does seem to admit of possible differences of degree in quality of work done).

In my own way of thinking, this view is definitely false. Science cannot flourish equally well under any kind of ideology or social system. Is it not true that Germany did not get the atom bomb just because the "non-Aryan" physicist like Einstein and Lisa Meitner fled the country? Is it not true that in Russia Lysenko genetics is dubious precisely to the extent that it is forced to conform to Marxist dogma ("laws of dialectical materialism")? And what scientist in a genuine democracy would defend the anthropology of a "superior" race or nation based on the false notions of "first" and "second" class human beings?

If one tries to modify the foregoing argument somewhat and argue that some kinds of science (chemistry, let us say) can flourish in any political system, the idea is still false, because it assumes an atomistic conception of knowledge that is contrary to fact. Nature is one -- the very word "universe" indicates that -- and all knowledge is interrelated: that is what progress in science teaches us. Indeed, there is a kind of circular reaction-arc (a feed-back mechanism is the current phrase)

between the lowest and the highest concepts which makes our very conceptions of the "laws of nature" subject to change and progress. Professor Lundberg seems to assume that everyone who believes in democracy must think of it as a static thing, but if we realize that our formulation of democracy is an evolving thing, his suspicion of it as a possible enemy of scientific objectivity would be lessened, I believe.

As part of the argument that this half-a-man theory is false, I next propose to show that it is based on an unsound psychological theory. The separation of "fact" and "value" assumes that reason and emotion are independent and self-contained elements of human nature. This atomistic conception of man is the modern form of the older *faculty psychology,* and if there is anything at all to the newer organismic theories, such elementalistic formulations are outmoded. Reason and emotion, intellect and feeling, are dynamically interacting phases of man's total personality and should be mutually sustaining aspects of selfhood. Accordingly, my own counter-proposition at this point is this: *Science is not ethically neutral because reason and emotion are not alien to each other, and the effort to separate them results in personal and social consequences that are harmful to all.*

Let us develop this thought at greater length.

If the "ethical neutrality" of science presupposes that scientific activity excludes emotional components, then such a neutrality is quite beyond human reach. Such urges as desire for social recognition, "love of truth," "passion for facts," and other affective drives behind human behavior, indicate the difficulty of conforming to the half-a-man theory of scientific endeavor. One is not always aware of the quieter but ever-present motivations. But the sudden death of a close friend or an unexpected catastrophe may "knock the pins" from under a scientist and render all his work meaningless to him, until he recovers some of his emotional—intellectual balance, and in these moments we realize how much the significance of our work depends upon steady emotional drives.

The proposition that emotion has no place in science is one that must be rejected. What is required is freedom from excessive emotionality. Of course, wishful thinking, manias, and phobias have no place in science. The ideal is enough freedom from bias and enough objectivity so that one can face the tragedy of all scientific research -- nasty little facts that can kill the most beautiful theories. The problem is to link emotion and intelligence together into a working relationship. Ideas

without emotion behind them are anemic, and emotions without ideas in front to guide them are dangerous.

This problem of the proper relation between reason and feeling has been much studied in recent years. Students in the field of Korzybskian *general semantics* tell us that what we need is a *cortico-thalamic integration,* which, I assume, is only a technical description of what in simpler terms may be called a *head-heart synthesis.*

This reference to the cortex and the thalamus as the supposed centers of thought and feeling calls to mind what the surgeon is now attempting in the operation of prefrontal lobotomy. Here the attempt is made to free the mentally ill of their obsessions or delusions, which grow out of the association of certain ideas with emotional fixations, by severing the ideas from their emotional backgrounds. Apparently this is a last resort to cure otherwise hopeless cases. *Actually, however, emotional tension can be a creative force in mental integration when the conflict is resolved through a higher psychic synthesis.* Perhaps the truth is that there is no general rule as to how much emotion a person may allow himself -- it may depend on how much intelligence you can bring to bear in guiding that emotion. Unfortunately, we have not yet learned how to use conflict and tension as a creative force in human evolution. This could be the next step in man's conscious self-evolution.

In support of this idea that intellect and emotion are not enemies, think of the work of some of the great scientists: Kepler, for instance, who, after the discovery of his three laws of planetary motion, exclaimed "Oh Lord, I think Thy thoughts after Thee." Or Sir Isaac Newton, who was so profoundly moved when it appeared that his law of universal gravitation might be verified that he was forced to employ another to complete his calculations. Or of Descartes who went into raptures over the discovery of the fusion of algebra and geometry in analysis.

In order to show that the foregoing are not isolated instances, but especially to provide support for our view that facts and values are not mutually exclusive, let me bring in as supplementary evidence the testimony of some contemporary investigations in the field of science. From a larger list of witnesses, I select the following paragraphs from Dr. Tuve's acceptance of the *Research Corporation Award* on November 19, 1947. In this address Dr. Tuve states:

"There has been too much talk about the neutrality of science in ethics and moral values. The writers who

have publicized this view have greatly misled and even frightened the public, and they have acted on a misconception. The body of organized facts in science may be ethically neutral in a special sense, but this is only one side of the picture. Science is a living, growing, changing thing, and it is impossible to consider any living thing as separate from its environment. I believe that ethical and moral values are essential elements in the nutritional medium of the social environment in which science grows. If these elements are distorted or weak the growth will be stunted; without them growth cannot take place and the whole fabric of scientific methods and materials will wither and die. Let me read a quotation or two from a talk by Professor A. V. Hill a year ago in England. He was speaking on the Responsibilities of Scientists in Modern Society.

"'If standards of truthfulness, frankness and integrity are relaxed, either for political motives or for private ambition and gain; if fraud, dishonesty and self-deception are not denounced; if propaganda is accepted in place of fact; if the common prestige and good-will of science are prostituted for base, sectional or selfish purposes; if secrecy or secretiveness is accepted as a normal condition of scientific work; if age, prestige or authority, if race or nationality, is allowed to hinder freedom of intercourse, or equality and interchange of ideas, between scientists of honesty and good will anywhere in the world; if there is widespread failure to recognize an unbreakable obligation -- as it should be -- that the benefits of scientific discovery must be regarded as a sacred trust for mankind, then, science itself may become impossible as a calling for free and honest men, while its exploitation for sectional gain, or national aggrandizement, may lead to conflict and destruction instead of co-operation and welfare.'"

Statements such as the foregoing by Professors Tuve and Hill could be matched by quotations from others -- from President James Conant of Harvard University, and Dr. C. Judson Herrick, for example, both of whom have protested against the exclusion of values from the domain of science.

The moral of this whole development seems to be that as the boundary between pure research and social applications has become weaker, the traditional demarcation between natural science and social ethics also has been obliterated.

But in order to clinch this argument that the universe of science and the kingdom of values are not alien and

hostile worlds, it is now necessary to state more explicitly just what "scientific method" is here conceived to be.

V. WHAT IS SCIENTIFIC METHOD?

I shall define a "natural science" as any body of knowledge about some part of the universe, whether animate or inanimate; that is, a science is a body of propositions that has been put into a coherent system of validated beliefs. This means that to have a science there must be a complex of facts that have been observed and classified in such a manner that it is possible to formulate laws of behavior enabling the investigator to predict what will happen in the future under specified conditions. The most fundamental assumption of this whole enterprise is the principle of the *uniformity of nature,* the postulate of lawfulness and predictive uniformity in cosmic and human behavior.

It is obvious that science, thus stated, is an end result, the product of the sustained use of what is called *scientific method.* But what, precisely, is this remarkable thing called scientific method?

As I understand it, *scientific method is democracy in thinking applied to the solution of human problems.* Thinking is always problem-solving activity; but there are many types of problems: practical and theoretical, individual and social, and so on. Wherever human intelligence or reason can be utilized in finding the solution, there scientific methods may be employed. The solution of the problem may satisfy man's curiosity about the "how" and "why" of physical phenomena, the "how" and "why" of biological evolution, of man's origin and social development, or the "how" and "why" and "where" of man's future possible evolution. Scientific method is democratic in the sense that any hypothesis that is not absurd in the light of our best present knowledge has the right to a fair hearing -- it is entitled to run the gauntlet of criticism, and, if it stands up under trial by scientific ordeal, establish itself as good, until replaced by a better hypothesis. That is half the story.

The other half of the story is that democracy is conceived to be that form of social life in which scientific method -- human reason in action -- is free to investigate the present structure and function, and map out the future evolution of society. That is, science not only contains the answer, in principle if not in fact at any given time, to the problems of social choice, but

scientific method provides the only technique for making social decisions. Thus we equate scientific method and democracy in the following symmetrical fashion:

$$\left\{\begin{matrix} \textit{Democracy} \\ \textit{as social processes} \end{matrix}\right\} \rightleftarrows \left\{\begin{matrix} \textit{Scientific Method} \\ \textit{as mental activities} \end{matrix}\right\}$$

Some critics of this view will point out that science is something that occurs in a laboratory, whereas social processes do not occur in a laboratory and are not subject to experimental controls, and therefore are extra-scientific in nature. Now it is superficially true that physics and chemistry as disciplines are advanced through experiments in laboratories, while social studies apparently are not. But if we view society itself as one vast laboratory, this assumed difference disappears. When the social sciences have found their rightful place in society, we may expect the mists of obscurantism to evaporate with the vanishing fog of supernaturalism.

No doubt there are individuals who will object to this proposed extension of the scope and authority of scientific methods. Of course there are various motives, good and bad, for these objections, and I next propose to examine the several bases for this distrust of scientific method in the solution of human problems.

VI. REASONS FOR THE DISTRUST OF SCIENTIFIC METHODS

The proposed inclusion of so many of the interests and activities of life within the purview of scientific methods is repugnant to many individuals. This fear and suspicion arise out of two main types of circumstances, one theoretical and one practical:

(A) Most of the opposition to science which rests upon theoretical considerations comes from a failure to understand scientific methods. This misconception or prejudice is based on a dislike of the supposed heartlessness of science: science is a cold, intellectual thing that clips the wings of angels and analyzes the salt content of human tears -- and so on.

This is a very narrow conception of science and scientific method. For a "scientific humanist" it is possible to have so much confidence in science because, as already noted, scientific methods are rich and flexible. Scientific methods do not rule out feeling or emotion; and now we add that it is even possible to find a place for "intuition" in science, provided it is recognized as the *insight* of gestalt psychology.

Clearly scientific methods in physics do not require "feeling" or *empathy* in the interpretation of physical phenomena -- this could easily lead to the odious "anthropomorphism" against which physics protests. But in understanding life processes, we do need some measure of *feeling with,* or sympathy, to understand the behavior of a living organism. In biology and psychology, and the social sciences generally, a behavioristic approach has definite limitations. The general principle seems to be this: *scientific methods must be adequate to the nature of the material to be dealt with.*

It should be noted at this point that we do not insist that every human interest and activity must be subjected to the tests of scientific methods. To the question, must the whole of life be amenable to handling by scientific techniques? we answer: Not at all! Human nature is complex. Man has many sides to his nature, and reason is but one facet of man's personality. Aside from his rational activities, man has aesthetic and recreational needs. These needs we classify as part of man's non-rational (but not irrational) existence. Playing tennis, painting pictures, enjoying a fishing expedition -- these enrich life and need not submit to rational tests or analyses. But if a man is pretending to reason, then he must submit to the standards of reason. If economic plans, political ideologies, and religious creeds pretend to be rational, they must conform to the requirements of scientific methods. If religion presents its case on the basis of an aesthetic appeal, there is no need to test its values by logic; but if religions make claims to truth (as they do), then they must validate their claims by recourse of logic and scientific methods.

(B) In the second place, vested interests in the social institutions of politics, business, religion, and even education, may oppose the extension of scientific analyses and experimentation in the solution of human problems. Vested interests may fear the extension of scientific methods because they foresee that this may adversely affect their own special privileges. Thus the private power companies opposed the TVA experiment because they feared (wrongly it turned out) that this "governmental competition" would cut into their profits. The Smoot-Hawley tariff bill is another illustration of the failure to study a social problem scientifically.

One more illustration will prove instructive. During the days of the "New Deal" reforms, the head of a large business enterprise -- a leader in the electrical industry -- spoke against the "crack-pot experiments"

of the "brain trust." Quite frequently the spokesmen for "big business" rebel against government regulation as interference with the system of "free enterprise" and the "laws of economics." But is there not something paradoxical in a situation in which a representative of the electrical industry protests against social experimentation, when the very survival of that corporation depends upon the experimentation that goes on in their own research laboratories?

Of course there is some justification for this fear of experimentation on the human level. It is the justification the medical profession may feel when they are confronted by sudden and drastic changes in established medical relationships. An experiment in a laboratory of a large industry, if it is dangerous, still involves only a few lives. (But how about the first atomic pile experiment at the University of Chicago?) Moreover, the researchers have a good idea of what they are doing, and if they are killed, their dependents are taken care of; and finally, if the experiment is unsuccessful, you can return to the old way of doing things. But not so in a large-scale social experiment -- failure of the experiment may spell disaster. For example, if a national compulsory health program, once adopted, proves a failure, we may never be able to get back to the then-discarded system.

And so this brings us right up against the most difficult problem: *What is the place of social experiments in a democracy?* Or more generally, what should be the place of social science in the framing of social legislation?

VII. SCIENCE AND SOCIAL CHANGE

The theory of science here set forth leads naturally to the view that the planning of the future course of social change should rest largely in the hands of social scientists who combine practical experience with theoretical knowledge. In his *Republic* Plato called the members of his supreme council by the title of "philosopher-kings." There has been some hostility toward this type of "intellectual aristocracy," and some critics have condemned Plato's ideal society as a "blue print of the fascist state."

The idea that social guidance by those who understand and have wisdom is "fascism" is very misleading. If democracy, acting on the assumption that all men are created equal, is so interpreted as to result in the

"cult of mediocrity," it is bad, by whatever name it is known. Plato's conception of "equality of opportunity according to capacity" seems sound to me, and I see no reason for its culminating in a new bureaucracy of vested interests -- provided there is always social mobility, down and up, according to ebb and flow of talents. Nor do I recognize in such caricatures as Aldous Huxley's *Brave New World* any faithful social image of what Francis Bacon called the "New Atlantis." A scientifically organized society can still be a human society, as indeed Sir William Osler recognized when he linked science and humanism together.

After all, what is here proposed is not so very different from what we have. Democracy is a society where there is freedom of thought, and legislative action through elected representatives who are responsive to the will of the majority. In such a society we can have all the particular "isms" presenting their various programs: here Christian Scientists, Marxists, Catholics, Jews, Protestants, Mohammedans, and the rest, speak their pieces. The interested groups make their choices, and if minority groups are guaranteed their basic freedoms and all of us retain the right to advocate changes in policies, we can get along together. Of course, for the maximum of democracy we need an education that trains the people to think, we need free access to information, and the complete separation of church and state.

But there is one place where a scientific humanism asks for modification in present practice. In a dynamic democracy we need to develop a program of social experimentation, perhaps even an order of priority, on a limited scale at first and under the direction of honest and competent social scientists, where plans for future social change can be tested under controlled conditions. These "experts" in economics, politics, jurisprudence, and the other social sciences, who have distilled the wisdom from the lessons of human history, should be called upon for advice in mapping out social programs. The attainment of the wisdom we have in mind calls for a kind of integration of knowledge which we do not now have. But I have confidence that we could get such social wisdom if our Congress were to set up the proposed *National Science Foundation* and assign an important role to the social sciences. However, this is still a *national* foundation, and it may well be that much future planning will be done on a world level, and that might call for the kind of organization that has been proposed under the names of THE INTERNATIONAL INSTITUTE OF SCIENTIFIC HUMANISM, or a WORLD UNIVERSITY.

However the need is met, it must always be remembered that the present wide-spread animosity toward planned cultural change is quite unrealistic. There is much social experimentation going on, and there are social controls in operation -- we are all included in the "one hundred million guinea pigs" -- and the only question now is, who is going to control our social experiments, and for what motives, and for whose benefit? It should be clear that social experimentation by the citizens of a democracy through their humanistically trained scientists is in safer hands than under a system of experimentation which serves the limited interests of specialized groups. Surely Plato was right when he declared that the ills of society would never cease, until philosophers became kings and kings became philosophers. All this means is that those who have the knowledge should have the power, and those who have the power should have the knowledge.

VIII. MAN AND THE UNIVERSE

The goal of science today is more science tomorrow, and the goal of democracy today is more democracy tomorrow. You can't achieve the one goal without attaining the other, because the goals of both science and democracy are the same: *the growth and expansion of life into new areas and dimensions of the universe.*

The Marxists say that the goal of man is to change the world. A more detached approach shows that you cannot change the world -- at least not intelligently -- until you understand the world. The faith of the scientist is that there is nothing in this universe so wonderful, so sacred, so mysterious, that man cannot understand it. Everything can be understood and explained, if only we persist in the search -- that is the supreme faith of the scientist.

Nature may, or may not, have intended, in producing man as the present pinnacle of biological evolution, to bring into being a creature who would ultimately take over the remaking of cosmic processes, but in any case this now seems to be the only clue to any broader meaning to universal history. If there is any antecedent meaning which is being worked out in history, man somehow personifies this exploratory tip of significance; and if there is no antecedent meaning already present from the earliest stages of the cosmic drama, it is time for man to enlarge his role and become not merely the principal actor, but also the playwright who will write the remaining

acts of the drama and make sense of that which otherwise has no meaning.

CONCLUSIONS

1. By its very nature science has ethical assumptions and implications -- it is committed politically to the democratic way of life.
2. Science flourishes best in a democracy, and a democracy is that form of social organization which can make the maximum use of the benefits of scientific knowledge.
3. Secrecy is alien to the spirit of science, and a nation that withholds scientific knowledge from the public is to that extent undemocratic. At the present time the requirements of military secrecy may make this necessary; but it is still undemocratic.
4. It is clear that we have reached a point in human history where we cannot have full democracy anywhere in the world unless we have it everywhere. To bring this about is the job of UNESCO.
5. The goals of science and the goals of life are interwoven in the expansion of life into new dimensions of reality. The supreme function of science and of life is to understand the universe, to explore all the depths and shoals of the cosmos, and to tame man's inner world and the outer universe for further human adventures.

CHAPTER IV

ARCHETYPAL MAN

I. THE SOURCES OF PROGRESS

In man's long history two currents are intertwined like the serpents of the caduceus: one is the current fear that expresses itself in the principle of religious and political authoritarianism that works to prevent change, while the other is the current of freedom-seeking impulses powered by the desire for the truth that makes man free.

The great crises in history have been those in which societies of men free from fear have struggled against

attempts at tyranny by men who rule by fear. Fear of the forces of nature, fear of change, fear of failure, are only a few of the overpowering fears that prevent men, as individuals or as groups, from moving out of stagnant worlds into adventure and the life more abundant. Evasion, escapism, expediency, all devitalize those who should be seeking new roads to freedom.

The greatest of all freedoms is freedom from fear. When men have attained freedom from fear, the other freedoms will follow in the wake of the great freedom. This begins with individuals and becomes a group characteristic. Throughout all our history, the freedoms we have gained, the new levels of social organization we have attained, have been due to those individuals who have had the courage to be free.

We should never forget that it requires more than ordinary valor to accept the implications of freedom. There are many writers and teachers living in our world today who have not this courage and who achieve their celebrity by evading the issues of freedom, taking refuge in the fear-raid shelters of outworn formulas. Recognizing this possibility, our greatest teachers of all ages -- men like Socrates, Jesus, Spinoza, and others -- have stressed the need of moral strength as a background for those who would be free. Instinctive man fears the unknown, wherever he comes upon it, and it is only the strength of a higher nature that endows man with the courage to explore the unknown; especially is this true when the unknown is within himself, when it is the mystery of his own being that he seeks to solve.

It is this element of fear that is largely responsible for what one writer calls a "tradition of misery." Man's unhappiness, degradation, frustration have been accepted as inevitable, an essential part of human existence. Only rarely has an original thinker rebelled against the tradition and set out to achieve reforms which would in some way ameliorate some of the misery. This tradition of misery, until recently at any rate, had the support of our religions. In the oriental world human life was regarded as the greatest of evils, something from which to escape by the most severe disciplines. And in the west, as we know, man became a miserable worm. Original sin and the utter unworthiness of the human person were the heritage of us all.

How and when did we establish this tradition of misery? Why has the sense of misery -- *forlornness* as the French existentialists term it -- become so universally prevalent in human life, in all ages and on all continents?

The answer, we believe, is that the sense of misery and sin grows out of the frustration of human evolution, the presence, always, of a "stop man" movement. There is no human condition so powerfully charged with misery as the state of futility which comes with frustration. The hopelessness that submerges the individual in a state of futility is the cause of much of our widespread psychological sickness and insanity. Futility is the mood that seizes the person who cannot cope with the circumstances of life. In the worst cases suicide or insanity is the nearest door of escape.

And what is futility? It is the polar opposite of creativity. It is the sense of impotence, of the complete incapacity to mold the circumstances of life to the pattern devised by the individual out of the materials of his environment. It is an admission of impotence, of inability to create. It is the inhibition of the most powerful single impulse to create. Man is not by nature a passive agent in the world into which he is born. The normal child looks out upon the world as something he can model to meet his demands. Unfortunately, children have that instinct curbed by the time they learn to walk, and they soon discover that others have been here before them and have modeled a world into which they expect the child to fit. It is a rare person who preserves sufficient vestiges of creativity through childhood and adolescence to be able upon maturity to set out with hope and faith to create his little fragment of the world into some semblance of his inner vision.

II. TRIUMPH OVER FRUSTRATION

Futility is rooted in fear; creativity is rooted in hope. Every act of creation, no matter how small or how great, begins in the hope of producing something better than existed before. Faith, hope, and creativity are the factors in human social evolution; fear, hopelessness, and futility are the earmarks of obstructed evolutionary trend in man's progress.

There have always been elements in society, ever since man created a tribal society, that deliberately obstructed the evolutionary trend in humanity and created the sense of futility in order to rule through fear. Men condemned to futility are men full of fear and therefore weak. In such a state, mental and social, humans can be ruled by those who play upon weakness. In our modern mechanized society, the effects of poverty

have been to create a sense of futility on the part of large masses of people. Labor leaders know better than anyone else the great difficulty that arises in rousing men and women suffering from this sense of futility to the point of participating in the creative work of changing the conditions under which they live. For that reason labor has had to resort to enormous educational schemes and cultural programs to break down the inertia that paralyzes the factory worker and the slum dweller.

The task of creating personal qualities, skills, codes of values, objectives and disciplines, by means of which the good life can be designed and constructed, has become the task of education. In a general way liberal education has been far more loyal to the concept of the evolutionary spirit in man than have been the religions of the world. Modern education, at any rate, has never subscribed to the concept of man as a miserable sinner, but has upheld the idea of man as an evolutionary being capable of tremendous growth. This type of education -- progressive education -- has developed into one of the great buttresses of modern democracy.

The fact is that religion has failed to keep alive the creative spirit in man. It has substituted for the creative attitude toward life here and now the soporific vision of a sort of Cosmic Santa Claus who will some day give humanity the perfect world, the "City of God," all ready to move into, but in a world beyond death; and the passport to that dream world is the grateful acceptance of sufficient misery in this world to guarantee admission to the Heaven in which all who get there will be eternally idle Peter Pans.

The symbols of this religious misconception are the states of Heaven and Hell. Hell is the eternal pit of Futility, where men are frustrated, tormented, condemned to endless life in a condition of hopelessness. Heaven, on the other hand, is the state into which the soul passes after death wherein it can create whatever it desires merely by an effort of the imagination. Heaven is the state of illusion in which man's frustrations are removed and without effort he creates everything he desires, just as he desires it.

Heaven and Hell are poor substitutes for the school of this world in which the human person learns his strength and courage, his visions and skills, by actual creative effort, taking his failures with his successes, and manifesting in the flesh, by the potencies of head and heart and hand, the divinity which endows man with the cosmic energy of evolution and with insights into

future paths of progress.

The scientific humanist holds that the greatest need of our world today is a creative morality which will free men from fear and frustration. Aside from sheer laziness, fear of change, and the restraints of vested interests in business and politics, the greatest obstacle to human progress is the illusion engendered in people who "go to church" and then come away filled with the comforting certitude that because they "have religion," they are moral individuals.

By instilling a kind of negative morality -- for example, obedience to the Ten Commandments -- traditional religions have discouraged men from thinking creatively about social issues. Puritanism in morals, "legions of decency," and the like, have made it difficult to even think about such fundamental questions as the proper biological and social relations between the sexes. Prohibitions and censorship and repressions -- these have been the substance of a negative code of morality. Orthodox religions and established churches have stifled man's urges toward a rebuilt world. But morality at its best is positive; it is creative; it consists in doing, not in being. "Spirituality" in the negative sense says, "be good sweet maid and let those who will be wise"; but creative morality asks, "how in the world can the sweet maid be good if she isn't wise!"

III. ETHICS VERSUS AUTHORITARIAN RELIGION

A scientific humanism rests its argument on the fundamental proposition that reason (human intelligence) is the only tool, and scientific method the only method, for building up the bodies of knowledge we need for finding solutions to our problems. This view, therefore, is openly and decisively opposed to the following conceptions: (a) the theological doctrine of the verbal inspiration of religious literature (the scriptures); (b) the belief in revelation, intuition, or any other non-rational method of validating beliefs; and (c) the idea that any institutional authority, or tradition, or person has the right to tell people what to think. We can only set up a democratic method -- scientific method -- and then ask human beings to arrive at whatever conclusions they will arrive at.

Such an approach has several consequences for morality or ethics.

In the first place, this means that the science of ethics must be freed from its traditional theological

background, so that moral problems can be considered without reference to such debatable matters as the existence of God, immortality of the soul, heaven and hell, and so forth. "Sin" as violation of the "laws of God" has no place in ethics as a secular, social science concerned with right human relations in this world. A corollary of this is that no institution which incorporates such beliefs in its dogma or creed has any moral right to prescribe what attitude human beings shall take toward such social questions as planned parenthood, child labor, military service, censorship, prohibitions, and the like.

In the second place, this statement of scientific humanism condemns any society which makes impossible the free discussion of all issues. In its program of social reform humanism favors a democratic government which progressively refashions itself through the legislative procedures of representative government.

A common criticism of such a secular or non-religious system of ethics is that it won't work because it lacks the "dynamic" of religious motivation. Furthermore, it will be argued, you have here no basis for moral obligation, because only God can provide the source and sanction of moral principles. Let us consider this argument.

IV. THE STARTING POINT FOR ETHICS

What should be the starting point for ethics? Shall we start with religion as the basis? We have already indicated the answer we give to this question. When you start with religion, you must start with some particular religion. But what religion should be honored in this manner? In a cosmopolitan community -- a university, for example -- we have members of all kinds of religious groups: Protestants, Catholics, Jews, Hindus, Moslems, and so on. Would the representatives of these respective religions agree to start with the teachings of some religion other than their own as the basis for morality? There is reason to doubt it!

Does this approach completely rule out religion?

From the present point of view, authoritarian religions and the institutions through which they function -- the churches -- are as conservative as they are powerful. The average person gets his ideas of right and wrong from two sources: (a) from the folkways, customs, and codified laws of his society, a knowledge of which is passed on from one generation to the next through the media of secular education, and (b) from religious

instruction in the church and the home. Up to now, religion and secular morals, however they may be divorced in theory through the "separation of church and the state," are in actual fact closely related. The time has come to sever this alliance in fact as well as in theory.

It will be noted that in the present view God is not posited as the basis of authority for man's moral obligations. If one asks, "Why should I be good?" and the answer is given, "Because God commands it!" one may well raise the question: "Who knows what God commands?" Thus we rule out dictatorship from the field of morals. There must be a naturalistic-democratic basis for morality. Morality needs no super-naturalistic sanctions. It is not heaven-sent; it is man-evolved. In the coming planetary civilization of a world-embracing humanism those religions that obstruct social advance must be declared obsolete.

This means that as time goes on ethics must increasingly be taken out of the field of tradition, authority, and revelation, and put more and more into the field of human intelligence. Today we are moving toward a planetary civilization for which a universal ethics must be evolved. In the past morality has been a matter of latitude, longitude, and even altitude; but in the future we shall need to establish relationships through techniques of international living expressing universal values. Fragmentation in society must give way to integration.

It is true that some of the selfish people in this world today are asking, "Why should I co-operate, why sacrifice myself, why 'behave myself,' if the opposite is easier and more profitable to me?" One may reply to this, even on the level of fact and not in terms of ethical principles, that the highest human satisfactions come from the co-operative quest for a better society, and that human mutual aid, which seems to be the basis for the moral sentiment, really pays in terms of self-interest. But in terms of principles it can only be said that the possibility of any kind of society ultimately depends upon "fair play" or "good sportmanship." If you are willing to accept the benefits of social life, and voluntarily live in a community of fellow human beings, you accept an obligation to recognize the rights and interests of others in that community. In a democratic society "every right implies a corresponding duty" -- that is the only basis for ethics. Some have asserted that we have stressed too much the "rights" of the individual -- the "right" of labor to strike, the "right" of the farmer to subsidies, the "right" of free speech, and so forth -- and have not em-

phasized sufficiently the "duties" of all of us in society.

The earlier theory of the basis of moral obligation, known as the *social contract theory,* is no longer accepted by scholars, but I think there is a kernel of ethical truth in it: we ought to act *as if* society had originated in a contract. In any case, we are born into a society, simple or complex, and the socializing and moralizing process begins with the smaller units and progressively extends to the more inclusive. Historically and genetically we humans have been socialized from the family through the tribe, the city-state, the nation-state, to the coming world-community. Psychologically one merges one's self with humanity through the immediate community; therefore a world federation of friendly cultures is merely the globalized projection of the smaller circle of good will.

It is not possible here to analyze fully all the problems involved in the development of an evolutionary or scientific humanism. Suffice it to say that every complete system of ethics implies at least two things: (a) a *theory of the nature of the human organism* -- a theory of man, in short; and (b) a *theory of social progress* -- a theory of the better society we desire to create. Let us now examine how a scientific humanism may deal with these problems.

V. THE REQUIREMENTS OF A SCIENTIFIC HUMANISM

An evolutionary humanism takes its point of departure from the fact of an evolving organism in a changing society. These two complex variables provide us with the twin objectives of:

(1) *creative self-evolution -- subjective planning;*

(2) *progressive social evolution -- objective planning.*

These two types of planning are complementary -- when one studies them, it is almost as if one were seeing double. The first, subjective planning, must be guided by some conceptions of *archetypal man.* The existentialists tell us that existence precedes essence -- meaning that in this case there is no antecedent essence or type that provides the eternal pattern for what man is. For an evolutionist, to be human is to use man's intelligence for the purpose of rising above what man has been and still is. This, for us, means that man is "on his own" and must next form an image of himself -- the model of a reality to be created. Man's vision of himself is the only archetype for what man will develop into. That is what we mean by "subjective planning."

On the political-economic side, objective planning will provide the social model of reality -- the image of what the more perfect society will be. Such a theory obviously emphasizes man's freedom and self-evolution. It cannot be harmonized with the older materialistic and behavioristic theories of personality. But this is no surprise, for new biological and psychological theories (especially *field* theories) call for such departures. Let us therefore glance at the implications of the older materialisms in terms of consequences for psychological and social theories.

VI. SCIENTIFIC MATERIALISM: FROM ATOMS TO MEN

The 19th century was an era of atomism. Every atom of matter and every particle of the social system was an individual and absolute entity. The physical atom and the social atom were the indivisible particles of our thinking then. In social theory the 19th century glorified the individual -- the successful individual. Like the ultimate particle of physics, every man was a self-existent atom of society. Professor F. S. C. Northrop attributes this idea to the influence of John Locke's philosophy; but the writer has tried to show that it is the consequence of Greek logic and metaphysics.

When science discovered that the atom is not self-existent, not an ultimate particle, but an organism dependent upon a field of space-time for its character and functions, the scientific and philosophical basis for atomic absoluteness and privacy was dissolved. Now, in the same way but on a higher level, we have come to realize that man is not an ultimate particle of society, that he does not create *de novo* the values he enjoys, but in part owes his nature and his values to his relationships -- to his fellow men as well as to the other nature which is the vast cosmic continuum in which humanity lives and moves and has its being.

Scientific humanism has no use for either a mechanistic science or a super-naturalistic religion. Analysis and dualism belong to the older order of thought; synthesis and correlativity to the new order of thought which finds a place in nature for spirit (guiding fields), and in spirit for matter (particles). Science no longer finds the dualism of "mind" and "body" tenable; philosophy no longer requires the dualism of "matter" and "spirit." Body and mind are two poles of one organism; matter and spirit the two poles of one universe.

This progress in knowledge owes nothing to orthodox religion. If men turn to science today rather than to traditional religions for guidance, for the symbols of hope and contemplation, it is because they feel that in science, not in institutionalized religion, are the springs of new truth. Science has been abundantly productive of fresh, upsurging ideas, theories, applied methods, and promises of a richer life. Science, in a word, is capable of continuous inspiration. In the last century, which has been one of uninterrupted inspiration in science, institutionalized religion has been static and inert. Authoritarian religion has no seers to offset the scientific knowledge of the *mechanism* of the material world with any dynamic proof of the *intelligible nature of the* universe. Religion stood aside, adapting itself as best it could to scientific knowledge, until the sciences contradicted their own materialism by penetrating through matter and moving into a hitherto unknown world of field plenum dynamics.

It is not the religious institutions that we have to thank for the restoration of man from the status of a machine to the status of a self-directing being. *It is science, in the pursuit of truth, that has instituted its own revolution of liberation.* Scientific materialism bequeathed to us the machine, which is the keynote of our new civilization. But while technology instituted the ideal of the machine and while men bowed to the religion of mechanism, the machine was the master of man. Fascism is the apotheosis of social mechanism, just as authoritarian religion worships the idols of theological domination. Fascism -- theological and social -- is passing with the disintegration of authoritarianism. Man is the master, and the machine is his tool -- that is the faith of a scientific humanism.

VII. DEMOCRACY THROUGH SELF-CULTIVATION AND SOCIAL PLANNING

Scientific humanism regards the universe as still in process of creation and man as an evolving creature only part way along the road to some as yet undetermined goal, and man's present phase of development as an aspect of the emergence of new psychological faculties with accompanying changes in biological and social adjustments. To escape the influences of an ancient and dreary materialism, we must create a new vision of the possibilities of man and fire the imagination of multitudes into the conviction that the future of man must be created by man.

Once man thinks for himself, his future is in his own hands.

Just as self-cultivation is the key to man's personal problems, so social planning is the key to man's social destiny. On the one hand -- as Harold Rugg has pointed out -- we must produce the economy of abundance which is made possible by our resources and technology, and on the other we must design a creative and personal way of life within that social structure. The guide to the one is social planning by the technologist, and the guide to the other is the self-cultivation illustrated by the creative life of the artist.

We have a chance to create a new kind of revolution. Will we take it? Can we re-orient ourselves so that our code of human values will be shifted from a preoccupation with possessions, wealth, and private power, to the idea of co-operative living in a world community based on the principles of social planning and self-cultivation? If a code of values, ideals, and ethics can be formulated in time and with sufficient clarity to become generally recognized before the final social cataclysm is reached, then we will save ourselves from chaos and destruction. That code must be based on the nature of man.

Even in a "scientific" society we must have those teachers of the race whose vigilance will discover and ensure the unfoldment of sensitivity and the enrichment of out-going personalities without which democracy would be fruitless. It is not alone the full lunch pail and universal suffrage that symbolizes democracy, but also the release within the social unit of one's own natural resources. The sense of psychological insecurity that comes to men who are malnourished with the husks from which all inspiration has long been threshed drives them into a stampede for wealth, for possessions, to bolster them against their sense of poverty and give them a temporary fullness. Possessiveness then replaces the natural creativity within each man. No truly creative person is ever possessive.

VIII. THE PSYCHOLOGICAL REVOLUTION

Man, we have said, is an evolving creature part-way along the road to some still-emerging destiny. Having reached the place where he is able to devise technical and speculative means for achieving a panoramic view of his own long past, he is beginning to peer into his future evolution. In this drama of evolution man sees that changes in consciousness have marked his transmutation

from primitive forms of mentality to the present self-conscious state of man today.

In spite of this obvious fact that as he ascends the ladder of evolution man experiences climactic changes in consciousness, no comprehensive social theory has yet been developed based on this evolutionary change in human life. Man cannot dissociate himself from the character of the universe of which he is so much a part, concentrating within himself as he does the electrical substance, qualities, and laws which express the universe. Yet by the nature of his own consciousness man transcends the "nature" of the wider universe in which he lives and consciously, voluntarily, morally, controls and directs the course of nature in conformity with selected ends of his own choosing. Conceding all the facts of the physical world, of biological evolution, and of behavioristic psychology -- all the imposing array of evidence to prove that man has a physical make-up in common with the sub-human animals, that he shares his emotions and instincts with them, that he is so related to the vegetable kingdom that chlorophyll may become a substitute for blood -- *nevertheless in consciousness he may transcend all that has combined to provide him with the structure of his humanity: in function he is MAN, creative, moral, self-transcendant*!

At the level of intelligent consciousness, man has no rival. Rivalries within the human kingdom are rivalries between groups personifying differing levels of human consciousness. In a sense, fascism is a state of consciousness, imperialism is a state of consciousness, globalism is a state of consciousness. But humanity as the planetary species has no rival in biological evolution.

The most remarkable fact in all our accumulations of human knowledge is this fact of the evolutionary capacity in man, the possible unfoldment of new forms of consciousness. Julian Huxley, one of the wisest scientific thinkers, concedes that man's physical evolution is complete and that his future unfoldment is subjective, that the tides of evolutionary energy are focused in man's psychic nature. But even if this should not be true, if new biological structures were to be evolved -- possibly changes in brain structure -- it would still be the case that we can develop new states of consciousness. It is not too late. We must begin *now* the creation of a new mentality, a new way of thinking -- global thinking -- as the inescapable prelude to planetary planning and world community. Action now -- yes -- but action in the mental world and the ethical world as well as in the physical world.

The universe is an energy-continuum, a powerhouse, and man is an evolutionary outlet for power. Man cannot separate himself from the cosmic powerhouse though he may limit or extend his capacity as an outlet, and in doing this the effects of his actions as an individual impinge upon others. What he does is a part of the social whole. Democracy is inherent in that fact. On the human level individuation takes on a new dimension; it implies not selfish rights, but consciousness of universal relations; it is the individual that realizes these relationships. It is through the fulfillment of individualization that man evolves from the sub-person, enmeshed in mass instincts, into the individual capable of choice and direction, and at last into the super-person whose relationships are consciously creative. The methods and goals of such a creative self-evolution were set forth by the writer in an article, "Cosmecology: A Theory of Evolution" (later expanded as Chapter XXI of *The Promise of Scientific Humanism),* and later I shall return to this line of speculation. But first let us dispose of several alternative solutions to modern man's problems.

IX. TWO IMPOSSIBLE SOLUTIONS: NEO-SCHOLASTICISM AND EXISTENTIALISM

ATHEISTIC

The modern world has plunged from crisis to crisis, driven finally through desperation into setting up a world organization (UNO) to preserve a precarious peace. But still we teeter over the abyss with a growing realization that the status quo cannot long be maintained. The hour of great decisions is at hand: either the balance will go down into darkness and mankind will be catapulted back into the ancient seas of his lowly origin or the arc of evolution will swing upward into a new consciousness, a new concept of man as the core of all our planning and creativity.

Two outstanding answers to the problems of men have recently attained prominence: these two answers to the challenge of our time are neo-scholasticism and atheistic existentialism. The remarkable thing is that while these answers are antithetical, both suffer from the same limitation: lack of confidence in the capacities of human intelligence to create a more perfect society for mankind.

The neo-Thomist movement for the past 70 years has been directed at diverting the world from scientific education back to scholasticism. This revival of medieval aristotelianism, fused with Christian theology, would

set up a new authoritarianism and dominate man's mind through church hierarchy. But neo-scholasticism is anti-scientific, lacking confidence in scientific method as the proper means for discovering the truth that shall make men free.

Atheistic existentialism suffers from an equally bad metaphysics (though just the opposite of the aristotelianism of neo-scholasticism): a theory of contingency in nature which results in extreme individualism and ultimately in chaos.

If we start, as the existentialists do, with the proposition that "being" is always individual and indeterminate, of course the ever-changing and contingent world will not conform to the patterns of changeless essences which the Platonists and Aristotelians posit in order to interpret the world. Quite naturally, therefore, *existence* is not formed by *essences,* but essences emerge out of existence, and it follows that man can have no fixed nature or antecedent end. Life, accordingly, has no predetermined meaning, and the only meaning that could emerge is the meaning that man himself may be able to generate out of his own free nature.

This sounds very realistic to a disillusioned generation in a war-weary and decadent Europe. But in the long run existentialism is no more satisfactory as a philosophy than is neo-scholasticism. The existentialist is very sensitive to human tragedy, but he is not sensitive to the persistence of logical forms or patterns in nature -- such facts of *isomorphism* as the *gestalt* theorists have studied, certain universal principles of *polarity* as they are revealed in *field* physics and *organismic* theories in biology, psychology and sociology. Existentialism is too predominantly a literary gesture toward life; it has not been cross fertilized by contact with the social sciences. Moreover, to say that life is absurd and has no meaning, and then relapse into anguish at the horrible thought of man adrift in a godless universe -- that has something of the psychopathic about it!

X. A NEW DEPARTURE: ARCHETYPAL MAN

The one thing that existentialism can contribute to a scientific humanism is the idea that man can be free, if he earns and exercises that freedom; that is, we must utilize the measure of indetermination there is in the universe to create a new humanity. This brings us to what may well be the supreme problem of modern culture: *what*

image of man shall man make of himself to provide the morphogenetic forces for tomorrow's world?

Human evolution may occur on three levels: physical, mental, and moral. So far as neuro-anatomy can discern, there has been little change in the human brain for tens of thousands of years. But this does not rule out the possibility of further changes in the future. It may be that even in the brain as now constructed there are "silent areas" yet to be heard from, so to speak, and once these sleeping areas are awakened, the creatures of tomorrow may begin to function. Perhaps the *extra sensory* powers that Dr. J. B. Rhine has been investigating have their seat in such areas.

The best hope for the creation of a new humanity seems to lie in the improved integration of aspects of personality which are now at war with each other. If reason and emotion, intellect and feeling, the head and the heart, could be brought into synergic relation, we might intensify consciousness and bring about what the general semanticists have called a cortico-thalamic integration.

Here we have, then, the reply of scientific humanism to the appeal and challenge of existentialism and neo-scholasticism: scientific or evolutionary humanism responds by offering its own concept of man -- archetypal man as the avatar of synthesis! At present such characteristics as courage, imagination, love, and understanding, are infrequent traits in exceptional individuals. These traits need to be intensified, integrated, and universalized. Perhaps, as Colby Dam points out, it is not *new* qualities that we require; we need to invent "mass production" techniques for evoking the talents that are latent in mankind. This is a matter of taking rare personal qualities like sensitivity, love, insight into the formal patterns of existence (this is our substitute for "intuition"), and universalizing these characteristics. The task of an evolutionary humanism would indeed be difficult if we had to begin all over again; but hope lies in the fact that there isn't a human being living who doesn't have some of these qualities in some degree. To that extent every individual is potentially a member of the new humanity.

Obviously our image of archetypal man -- the avatar of synthesis -- is quite different from the "superman" of Nietzsche. The German philosopher's *ubermensch* was a tough, masculine creature free from what he regarded as the effeminate traits of pity and sympathy. Our own conception of the individual of the new society would combine traits that are masculine and feminine, within the same individual, not, however, in the form of

bi-sexualism, but more along the lines of the androgynous type of personality. The bi-sexual individual cannot really become androgynous, because he is in a sense crippled. Mature creative people are not crippled. We find such persons in highly developed men who acquire the qualities that Nietzche regarded as feminine, and in well advanced women who have what men flatteringly term a "male intellect." This is the kind of development that makes possible deep friendship among creative people who find a common ground of understanding that transcends ordinary sex relationships.

The development we have projected is probably based on the fact that on higher levels of understanding the dualities of psychological fragmentation disappear and no longer control one's attitudes: the total individual sees things in their universal relationships. Insight, humor, love, and the rest, have a universal character when they are "de-sexed." Perhaps the restoration of the unity of personality which Plato pictured in his myth of the separation of the sexes is what the poet William Blake had in mind in his conception of that resynthesis of human nature, and which Northrop Frye describes by the term "fearful symmetry." The evils of the "fall of man" are then finally undone when man returns on a higher level of evolution to that psychological "garden of eden" which we have variously designated as the *head-heart synthesis* or the *cortico-thalamic integration*. This sets a worthy goal for man to strive for. The achievement of such synthesis would unify the sciences, the arts, and the humanities. It would give education over all vision and objectives. In the production of such a unity each person would help to shape the world into the form of peace and happiness. Subjective planning and objective planning would converge and coalesce. Is that not a consummation devoutly to be sought?

CHAPTER V

PANTHEISM: THE RELIGION OF SCIENCE

The modern world finds the human family at war with itself. If we look only to the situation in religion, we find Hindus pitted against Mohammedans, Jews against Arabs, Protestant against Roman Catholics, with

communistic atheists and atheistic existentialists against the field. Such a period of mounting tensions should generate thought-forms which are able to rise above the old particularisms and provide an escape from ancient rivalries. As we have seen, one such possible higher viewpoint, transcending the battle grounds of ancient warfares is provided by pantheism, a religion of science which alone seems capable of going beyond the traditional landmarks to establish new outposts of the human spirit.

It is generally supposed that pantheism is a relatively new thought-form. This is certainly true in the culture of the Occidental World, though not so true of some forms of Oriental religion, where pantheism, for one reason or another, seems to flourish more easily. However that may be, it is clear that the religious tradition of the Western World (Europe and the Americas) has for many centuries been based on the belief in a personal god. The prevailing Hebrew-Christian tradition and the pagan religions of the Greeks and the Romans share this common personalistic conception.

Of course, as critics will point out, there *are* differences between the anthropomorphisms of the Greek and Roman religions of Olympic deities and the personal god of Christianity--especially when conceived as the Platonic One of certain rare types of Christian theology--but these differences are unimportant on the level of popular interpretations.

If we do not limit ourselves to the religions most familiar to us, and broaden our survey to include the entire panorama of man's religious development, one will find that there is a definite trend in the evolution of religion, and this is coupled with the parallel social evolution of societies. Indeed, one may arrange the parallel evolution of social structure and religious ideology in a step-by-step series, as the following scheme makes clear.

Evolution of Religion:

Polytheism	⟶ Henotheism	⟶ Monotheism	⟶ Pantheism
Tribal	⟶ National	⟶ International	⟶ Planetary

According to this scheme, primitive *polytheistic religions* are characteristic of tribal societies; *henotheism*--the worship of many gods, with one supreme deity--belongs to a social organization in which tribes have been united into a more inclusive economic-political unit, the nations; *monotheism,* in turn, rises to the vision of the brotherhood

of man under the reign of the fatherhood of god, with no chosen nation, though there is a select group of those who are "saved"; while *pantheism*, the next form of religious development, represents the transcendence of all exclusiveness, religious, economic, and ideological.

Now the reader is aware that in this book pantheism is presented as the next step in the unfoldment of man's religious life. The great appeal of pantheism to a thinking humanity rests upon its freedom from anthropomorphism--freedom from the attribution to god of human characteristics, virtues and vices. Early religions, as we know, were religions of fear; later religions make their deities the embodiments of justice, love, mercy; but in all cases, the focus of traits that are essentially human. Such personifications, as Spinoza pointed out, are really confining god, putting him into the framework of human limitations. This we have no reason to do.

Pantheism is free from all anthropomorphism, at least of the sort we associate with man's emotional consciousness. For a pantheist, god cannot be "angry," or "jealous"; not the source of "love," "mercy," or even "wisdom." In a society of pantheists, there are no "chosen" people, because our "Unknown Reality" is not what the Freudians call a "father substitute." For the same reason, there can be no partisan interference in the course of history as a result of god's intervention or "special providences." No pantheist can go to war because of the belief in an impersonal deity. The pantheist will seek "salvation" through knowledge, and so his is his own priest, pursuing the search for laws of nature rather than the search for special favors.

All this and much more can be said in behalf of pantheism. But before developing these comparisons, and in order to establish more precisely the differences in philosophy which underlie these two approaches to deity, let us pause for a moment and set down what seem to be the fundamental postulates which characterize the two viewpoints. It must be kept in mind that we are here thinking of the two main choices which confront the modern world: monotheism in its various current forms and pantheism as a possible substitute for such monotheistic religions.

THE POSTULATES OF ORTHODOX RELIGION, BASED ON THE BELIEF IN A PERSONAL GOD

I. God is a personality outside of and distinct from nature. He is an Infinite, Perfect Being, the all-wise author of love, justice, and so forth.

II. God is the Creator of the Universe and all that is in it, animate and inanimate.

III. God can reach down into the universe He created and work miracles, as He sees fit.

IV. If the world is destroyed by an "act of God," He will still continue to exist throughout all eternity.

V. God reveals Himself to man through selected prophets and through the sacred literature which these prophets have given to man as God's testimony on earth.

VI. The clergy are God's representatives and the chosen interpreters of the scriptures.

VII. The history of the universe is a drama with a beginning and an end, in the sense that all creation moves toward one divine event of the then-completed story. The universe is not an "open" universe, but a "closed" universe, for we inexorably move toward the Day of Judgment--the climax and finale of Creation's meaning.

Such seem to be the postulates of monotheistic religions of the variety we describe as orthodox or authoritarian. Now let us examine in a similar fashion the postulates of pantheism as they relate to these matters.

THE POSTULATES OF PANTHEISTIC RELIGION, BASED ON THE BELIEF IN AN IMPERSONAL GOD

I. God is not a personality distinct from nature. Deity refers to an indwelling spirit or field of influence interwoven with the visible physical universe. Behind the phenomena of nature which man investigates by way of his senses there lies a universal, real *substratum* which is accessible to human intelligence. This *substratum,* as it is termed in A. E. Milne's cosmology, is here designated the *harmonic base,* borrowing a term from Mr. F. L. Kunz.

II. The universe--the space-time-energy world--is eternal and uncreated. But within the cosmic continuum we find creation still taking place in local areas and on all levels of "matter," "life," and "mind." Miracles and special providences, however, do not occur. There are no "revealed" religions, and the belief in the "verbal inspiration" of the Bible must be rejected.

III. The universe is one, interrelated and dependable. Nature works according to uniform, predictable patterns which make possible the discovery of what man terms "laws of nature." The fundamental assumption of scientific method and of pantheism is that the universal processes can be understood: nature's modes of operation

will not put us to permanent intellectual confusion. The abundant success of science confirms this faith--a "faith" which is an expectation based on experience.

IV. The universe cannot be destroyed by an "act of God." Einstein's principle of the equivalence of matter and energy is a statement of nature's equilibrium between the *manifest world* in the space and time of perception and the *unmanifest world,* the field plenum of an invisible cosmic guiding influence which extends outside, but is not independent, of the four-dimensional space-time universe of physics. This cosmic energy continuum is what is called the *substratum* or *harmonic base* of reality.

A visual diagram attempting to picture this conception is given in FIGURE I. (page 61)

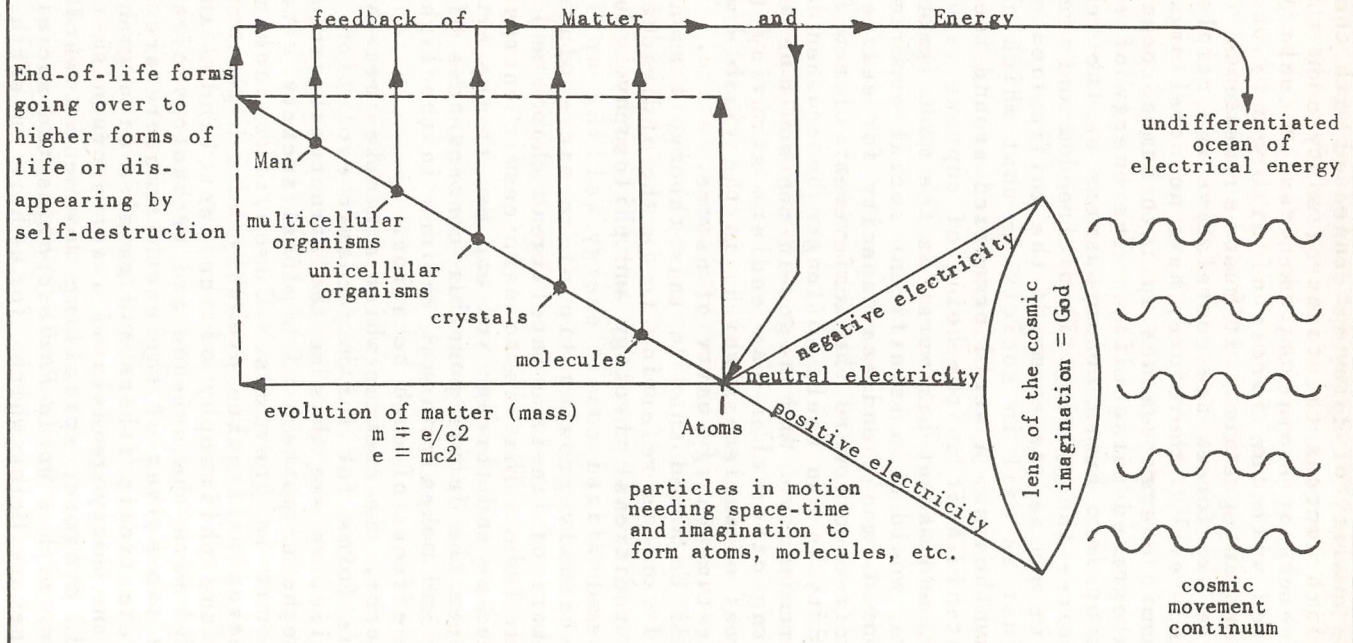
V. Since god and nature are one and the same, nature being the visible manifestation of invisible field-forces, there is no divine revelation as "eternal truth" which comes to man from some supernatural world.

VI. Priests and clergy have no private contact with higher sources, and they have no unique status as interpreters of God's will. Indeed, since "men of god" are usually not scientists, they frequently know less about god than students of nature and human nature. There is no "sacred" literature, liturgy, or communion; no uniquely religious experience; and the priestcraft is trading on ignorance and superstition when it promulgates such beliefs and practices.

VII. We do not live in the closed universe of a drama which culminates in some one "far-off, divine event towards which the whole creation moves." God must always remain the as-yet-unknown reality, for when god or nature becomes completely known and understood, the mysterious in life will have vanished. Why the "unknown" is likely, for a long time to come, to remain as the receptacle of the mysterious has been explained in the last chapter of *WORLD PHILOSOPHY: A Search for Synthesis.*

It will be observed that god, in pantheism, is conceived to be a guiding field of influence, giving form to that which was formless. This guiding field operates on all levels: at the lowest level in the transition from undifferentiated cosmic energy to "particles" and their subsequent control by the "ghost waves" which show the particles where to go; on the biological level through the *individuation fields* which control embryogenesis; on the psychological level through the *cortical fields* which produce mental synthesis; and on the human level through the integrative *fields* which are associated with social synthesis.

MAKING A UNIVERSE



In pantheism "God" is man's name for the Guiding Field or Cosmic Imagination by means of which undifferentiated energy is focussed in nodal points in space-time, subsequently to evolve under the influence of guiding fields on higher levels.

If the quality of deity is connected with the guiding fields which impress the forms of unity upon the structures of emergent evolution, then "evil" could easily be associated with the forces of disorganization which oppose such integration. It must be remembered, however, that these two forces are correlative and complementary. "Good" and "evil," therefore, have no moral significance until cosmic energy reaches up into human consciousness as an integrated personality. The energy of evolution thunders up into human consciousness as the vehicle of moral choice--the growing tip of freedom and creativity.

Evil in man is the enemy of the unification of experience, just as evil in society is that which obstructs social synthesis. A world organized around the concept of man-at-his-best as the being of supreme value in the universe, and man-at-his-worst as the most ignoble thing in nature, would be a significant social experiment. In such a world, man's endless capacity for self-evolution would be directed toward the achievement of new freedoms. The divinity in man would no longer be crushed by organized churchianity. And the god-in-man would be recognized as nothing other than the endless striving toward a future goal of wholeness which, in the visible world, is the space-time-energy unity of nature.

It will be noted that in this theory, I am not free, if the "I" one is referring to is the individual *ego* or *soul* of traditional theology and philosophy. But if the "I" is personalized cosmic energy welling up in man--the consciously growing tip of cosmic evolution--becoming aware of itself as intelligent choice and purpose, then I am free. That is to say, cosmic energy is free in you and me and through you and me, to the extent that it foresees the future possible consequences of present behavior and makes rational choices in the light of the probable effects of such behavior.

Of course, the choices which man makes merely proliferate the forms for further cosmic evolution. On the social side, we see this as the structuralization of the electromagnetic pattern of a global society. As we have pointed out in previous volumes, this coming world civilization will quite probably be a higher synthesis uniting the philosophy of the East (India and China primarily) with the science and technology of the West. Thus the two halves of the earth-armature are spinning out the electronic fibers and ganglia of a giant brain, guiding the embryogenesis of a world organism through a balanced, dynamic, spiralling movement toward a *World Sensorium,* with a *World Philosophy* as the social mind of that Planetary Being which, for us here on earth, is God.

How such a philosophy--a synthesis of pantheism and scientific humanism--makes possible a peaceful resolution of the world's supreme problem, the "East-West conflict," is what I propose to outline in the following chapter.

CHAPTER VI

A RESOLUTION OF THE "EAST-WEST PROBLEM" BY WAY OF A SCIENTIFIC HUMANISM

I. THE DILEMMAS OF OUR TIME

At the close of the last war, the United States Government summoned the representatives of "labor" and "management" to a meeting in Washington in order to try and find a basis for co-operation which would make possible increased productivity. For several days two hundred of the best minds in this field talked and debated. The results were fruitless. The most accurate summary of the "results" was provided by one shrewd observer who characterized the whole affair as a "meaningless squabble." Since that time, other labor-management conferences and wage-negotiation meetings have been held. Sometime the results have been fruitful in resolving controversy, but in the main the situation is still pervaded by tension and potential hostility.

If one looks to the parallel situation on the level of world politics, one thinks immediately of the conflicts of interests between communism and capitalism as these are symbolized by the so-called struggle between the East and the West. The conflict between the U.S.S.R. and the U.S. is a large scale, international analogue of the conflict between labor and capital within the domestic economy. And quite clearly, unless the conflicts on both levels are resolved, the results are likely to be the same--more conflicts--and, in the case of the international rivalry, more chaos and destruction.

Of course one possible solution to the problem of resolving the international conflict would be to create a world wherein the factual and ideological bases for the rivalry are removed. This would mean finding and establishing a universal system of social existence which would be applicable everywhere. Once such a system were

formulated as a theory, we would then need to find methods of achieving it practically. Both systems, capitalism and communism, might then be made to realize their own departures from the ideal system and would be under the necessity of making concessions in favor of the more inclusive system.

Obviously the prospects for finding such a system are not very bright. At the present time capitalism and communism stand far apart. Can they ever be brought into more harmonious relations?

We have within the lifetime of many persons seen two world wars. We are drifting toward a third war. The best hope for avoiding a universal catastrophe is to find ways of directing human energies into channels of such a nature that we have no need for thinking about "winning" the next war. All constructive social thinking should be concerned with this tremendous problem of avoiding another war. The whole world clamors for a resolution of the impending conflict.

Let us suppose, therefore, that it were possible to show that capitalism and marxist socialism are not based on assumptions that are completely at odds; suppose it were possible to show that both systems aim in a general way at some common objectives--for example, a "good society"--would it then be easier to find a basis for co-operation? If we could make a beginning in this manner, creating a willingness to find a common ground, might we progressively discover or create such a system as we go along, always converging toward common objectives as we learned to work together?

Such a system as we here envisage would have to be built upon a broad foundation. Surely one stone of that firm foundation would of necessity be the postulate: *physical laws and moral principles do not stand apart and isolated from each other but are interwoven.* Therefore, it follows, the regulative principles of the emerging civilization will not be mere arbitrary human conventions. If such a postulate could be validated, we might well hope to build that good society in the course of time. The better we understood these natural laws, the more chance we would have to follow through and avoid the conflict which threatens to destroy us all. It may be that conflict (action and reaction) is itself a law of nature's progress, but if it is, might it be possible to discover the principle which, in Hegelian terminology, could provide the next moment of becoming, the higher synthesis, without annihilating the antithetical systems?

One basis for the conflict between the "East" and the "West" arises out of the atheism of Soviet philosophy as

this is set in opposition to the theistic presuppositions of much of our western democratic theory. Certainly the fear of communism which we find in some democratic countries is based on the lack of religious freedom in Russia. How could such a basis of fear be removed?

Suppose we could get the scientists of the western democracies and the scientists of Russia to work and think together for a while; and suppose that they came to the conclusion that there are physical, mental, and moral principles which man should observe; suppose, furthermore, that on the basis of such findings of natural laws it were possible to demonstrate that neither system is completely correct, would that make it possible for the two systems to find a common ground of ideas and basis for collaboration? Suppose that after sitting down together both sides were to discover that there is a Supreme Imagination which has hitherto escaped the system of dialectical materialism, but that it is also true that this Supreme Imagination does not work through the miracles of revealed religion and the wonders of supernaturalism, but manifests itself through the orderly equations of physics and biology--would that make it possible for both systems to live together peacefully in the indefinite future?

The answer we give here to these questions is in the affirmative. To remove the sources of disagreement, we need to develop a view which resolves the conflict on three levels: (1) the level of religion; (2) the level of economics; and (3) the level of politics. The second and third levels are so closely interwoven that they cannot be treated separately. Let us begin our proposed unification by disposing first of all of the differences associated with the religious issue.

II. GOD AND NATURE

In the previous chapters we have sought to formulate a view which may serve both science and religion, in the sense that it can capture the minds and the hearts of men. Such a view constitutes a "scientific humanism," in the sense of serving a dual motivation.

If such a reinterpretation were universally accepted, the vituperative term of "atheist" would no longer be applicable to the followers of Marxist philosophy. We have already proposed that we call this superhuman--but not supernatural--being which men reverence, not by the traditional name of "god," but by the term, the *Supreme Imagination.* The function of this Supreme Imagination

in the cosmos is indicated in the preceding chapter in our diagram, *Figure 1.* A study of this Figure shows that "god," for us, is a kind of "Cosmic Lens" in virtue of which the undifferentiated energy of the universe is first of all focussed in those nodal points of the space-time continuum which appear to us in the form of what we call "particles" (electrons, protons, neutrons, etc.), then operating subsequently to control the emergence, on the higher levels of nature, of what we call *life* and *mind.* Thus, in a pantheistic fashion, we describe god in terms of *individuation fields* and *guiding fields.*

In this view we are prepared to recognize that the Supreme Imagination is inherent in all laws, physical, biological, mental, and moral, in the sense that these express the nature of reality; thus the Supreme Imagination provides nature and man with the possibilities for their existence and evolution. In so far as man studies natural and moral laws, he can make better adjustments than if he remains in ignorance of them. In connection with this reference to the relation of moral principles to natural law, it is interesting to note that General Carlos P. Romulo, President of the United Nations General Assembly, has recently affirmed that lasting world peace is impossible without the establishment of a universally accepted system of international law deriving its sanction ultimately from God.[1] This, General Romulo argues, is clearly demonstrated in the United Nations' declaration on *Human Rights,* which, he states, is "an affirmation of the essential rights with which man has been endowed by his Creator."

This theory is of course a current restatement of the "natural rights" theory as it was interpreted by such men as Thomas Jefferson and other eighteenth century deists. Students of the history of thought know that the doctrine is not unique to Christianity (as the General seems to assume), but even prior to early Christian theory was stated by the old Roman stoics and jurists. This historical fact is important, for it supports our argument that if the concept of God is to be introduced to provide the metaphysical underpinning for United Nation's programs, the only conception on which such an international and intercultural organization could agree upon is provided by pantheism. Certainly this is the only common ground on which India, China, Russia, Arabia, Israeli, and the western Christian countries can stand without reviving ancient religious conflicts.

[1] See the summary in the New York Times, December 11, 1949, p. 48.

We see, therefore, that this view, properly amplified and developed, promises a synthesis of dialectical materialism and theism and to that extent undercuts the philosophical basis for religious conflict. Let us now pass on to the other sources of conflict, as they arise out of differences in economic and political ideals and practices.

In order to give the reader a purview of our journey, let me point out that we shall first survey the differences between the two systems, marxist socialism and capitalism, and then we shall sketch the outlines of a world culture which might synthesize some of the more important features of the two systems; finally we shall glance over the road we shall have to travel if we are to get from where we are today to where we want to be tomorrow. We begin by looking at the two systems as they are now separated by the gulf that splits the world into communistic East and capitalistic West.

III. MAN AND THE STATE

The most convenient way to make visible at a glance the contrasts between Soviet socialism and capitalistic democracy is to set down the oppositions in the following TABLE I. It must be kept in mind that we are concerned primarily with the Russian system and the economy of the United States.

TABLE I (continued on page 68)

FEATURES OF COMMUNISTIC SOCIETY (Collectivistic -- in theory)	FEATURES OF CAPITALISTIC SOCIETY (Individualistic -- in theory)
1. Extensive thought control by minister of propaganda or his equivalent.	1. Limited thought regimentation by "loyalty oaths," "subversive lists," and control of mass media.
2. Materialistic and atheistic.	2. Hebrew-Christian theistic religious tradition.
3. Emphasis on centralization. Collectivistic state planning.	3. Private incentives. Individual initiative. "States Rights."

TABLE I (Continued)

FEATURES OF COMMUNISTIC SOCIETY (Collectivistic -- in theory)	FEATURES OF CAPITALISTIC SOCIETY (Individualistic -- in theory)
4. Controlled economy. "Five Year Plans."	4. "Free market" economy, operating theoretically according to the law of supply and demand. "New Deals" only during periods of mass unemployment.
5. One party system.	5. Multiple party system, under control of political machines.
6. Classless society (in theory but not in fact).	6. Socially stratified society, largely on economic levels.
7. State ownership and control of means of production.	7. Private corporations own and control means of production. "Collective bargaining" rights.
8. Labor theory of value.	8. No clear theory.
9. Nationalism and power politics. In theory the state will "wither away."	9. Nationalism and power politics.
10. Closed society of a dictatorship that discourages social evolution.	10. Closed society of corporate capitalism.

Quite clearly this table of comparisons is not complete. But even in its present imperfect form it brings out the fact that both systems could stand improvements. That is to say, the table uncovers some common weaknesses shared by both systems. This is suggested, for example, by the comparison of items nine and ten. Here we find, not differences, but agreements--to the detriment of the rest of the world. In general, both capitalism and

communism suffer from common defects when it comes to the important matter of human values, meaning here not economic values so much as the values of complete living. Let us develop this thought.

The dissatisfaction that many thinkers experience in the presence of Marxism today comes from the failure of Marxist theory to develop in any fundamental way beyond the point where Marx left it when he died. Instead of creating new values, Marxism does what some other forms of socialism have done: taken over the values of capitalism, instead of developing new principles. In present-day socialisms the sensory things to own and enjoy--all the things for which Christians and Jews compete in capitalism--are simply spread over a larger area. This is merely an attempt to spread to the masses of people the leisure, the security, the recreations, and the like, of the privileged classes of our society. This means that the socialists and the capitalists are equally "materialistic." Both groups are thinking in terms of traditional modes of thought. This comment does not mean that economic goods are bad, but that economic goods and security constitute the minimal conditions of decent living--not a maximal condition.

What is required before real change can come about is a reform movement with new values that are not merely economic. As we have previously noted, new concepts of individual development, participation, responsibility, and the like, must be evolved to counter-balance the collectivism produced by the technology which both capitalism and communism ("Soviet Socialism") have adopted. The possibility for such a "new individualism" (to borrow a term from Woodrow Wilson) is *not* ruled out in the "welfare state," as so many critics have wrongly sought to demonstrate that it must be. And while we are on this matter of labels, it might be pointed out that it would be well to substitute the term "Stalinism" for "soviet socialism." The right-wing group and the anti-socialists have come to refer to communism as Russian or Soviet socialism in order to put the term socialism in bad odor. Such confusion would be more difficult to induce if communism were referred to as Stalinism, which is more accurate anyway.

Now just as the conflict on the ideological level can be minimized, in theory, by finding a higher point of view, so in a similar manner let us explore the possibility of a model which might provide a common meeting ground in matters of economic and political conflict.

IV. ECONOMIC-POLITICAL INTEGRATIONS

It is quite possible that in these fields we have become more conscious of the differences than we are of the similarities. That in actual fact the world is moving toward a unified world culture is indicated by the rapid spread of the overall features which have been pointed out by Professor Oscar Junek.[2] Without claiming that he has made a complete list of all the items that comprise the total pattern of western culture, this investigator notes that the mainstays of that culture are the following: the use of motive power; the modern factory system; mass education; universal suffrage; modern sanitation and hygiene; public safety systems; soil chemistry; scientific food packing, storage and distribution; banking and insurance.

In the field of communications we find also woven into this total pattern the use of telephone, telegraph, teletype, and wire photo services, postal services, newspapers, periodicals, and books, radio and cinema. There is also the extensive use of railroad, steamship, automobile, airplane and elevator services, and the development of the arts, sports, and athletics.

One significant thing about the items in this inventory is that their cumulative effects are not merely national but international. As a result, the earlier differences in culture patterns tend to become subordinate to a kind of collective standardization of a mechanical sort. But in spite of this strong trend toward a "world culture," we still cling to economic and political doctrines which belong to the older world. While Professor Junek does not himself propose a corresponding ideological unification, this is precisely the conclusion which I should myself draw from this survey. If the military damage that can be done by economic systems that are highly mechanized is multiplied to the point where, in the atomic age, total annihilation of all is possible, then should we not seek unity between the clashing philosophies which incite or intensify such conflicts?

Professor Junek realizes that a world culture arising out of the spread of technologies is not itself a civilization. And Malinowski and others have pointed out that cultures cannot be transplanted without being remade or adapted. Accordingly, when we speak of a "world civilization," we are thinking of something still to be created by all men, and not (for example) of an "American

[2] Cf. "What Is The Total Pattern of Our Western Civilization?", by Oscar Waldemar Junek, American Anthropologist, 1946, Vol. 48, pp. 397-406.

civilization" that is to be superimposed on the rest of the world through economic penetration or dollar diplomacy.

Returning to our problem of resolving the differences between capitalism and communism, the reader may easily have guessed that democratic socialism is the answer we here propose. The more obvious features of such a compromise are pointed out in TABLE II.

TABLE II

FEATURES OF A MIXED ECONOMY OF PRIVATE ENTERPRISE (CAPITALISM) AND PUBLIC ENTERPRISE (SOCIALISM)
1. Rational (planned) use of natural resources.
2. Cooperative ownership or compulsory profit sharing.
3. Social security from birth to death.
4. Encouragement of the cooperative movement.
5. Limited socialization of industries and businesses involving large-scale enterprises, such as water power development, coal mining, steel manufacture, railroad transportation, public housing, public utilities.
6. Encouragement of private enterprise in the field of small independent business, especially where the owners are not absentee despots but responsible citizens performing useful managerial services.

The reader need not be surprised at our confidence in socialism as the solution to the problem. There is no other answer that has practicability and philosophical justification. The great danger to the world is that the citizens of the United States will not see that there are three roads instead of two. There are still three worlds to choose between: the capitalist, the socialist, and the communist. Unfortunately, all the middle-of-the-road socialists are being put in a difficult position all over the world, and in the resulting confusion there is danger of a reinstatement of reactionary governments in Europe, and then, quite possibly, comes open revolu-

tion and the likelihood of victory for the communists. Since the moderate socialists countries have neither the wealth of the United States nor the wiles of Russia, they are between the devil and the deep blue sea. Europe, as a socialist federation, could get back on its feet and live in the same world with the United States and Britain on a basis of friendship; but if socialism is destroyed, armed conflict is much more likely. The hope of the world seems to rest on the possibility that the United States will in time come to support socialist movements everywhere so that middle-of-the-road developments in world politics and economics can be promoted.

Formerly I have used the common term "democratic socialism" as the label for this higher ground synthesis which, we hope, is to emerge from the now conflicting economic and political systems of the world. But just because "democratic socialism" no longer provides a clear platform--some of those who call themselves democratic socialists in Europe are with the communists bloc and some are with the capitalists--it appears that it would be well to substitute a new term: let us say, *pragmatic socialism.*

But aside from the foregoing practical considerations, there are sound reasons why pragmatic socialism seems desirable. To provide this rational justification constitutes the next step in our argument. Here I shall suggest a novel basis for an economic-political theory which might serve as a broad foundation for an economy that permits both private enterprise and public enterprise to co-operate at those points where friction would otherwise generate enough heat to burn out the social machinery.

For the direction of my thinking at this point, I am indebted to a Dutch engineer, Mr. B. G. H. Vanderjagt (now a citizen of the United States), with whom I have discussed these matters. Out of the exchange of ideas were born the following formulations. I start with Vanderjagt's story first.

V. A NEW LABOR THEORY OF VALUE

Mr. Vanderjagt's interest in this subject dates back to his reading of the volume by Frederic Winslow Taylor on *Scientific Management.* Mr. Taylor had directed the attention of engineers to the value of time studies of movements, pointing out how the elimination of unnecessary movements makes possible the increase of productivity in one of the oldest human occupations, bricklaying,

without fatiguing the workers. As a result, the "costprice" of bricklaying could be reduced.

Next, Mr. Vanderjagt asked, what is this "costprice" anyway? He went to the economists for enlightenment, but this quest was without result, for they gave the engineer only vague descriptions.

Forced to work out his own definition, Mr. Vanderjagt formulated the theoretical expression for the costprice of a product and published the results in a Dutch engineering journal in the year 1925. The Formula is:

$$\underline{P} = \int_{t_1}^{t_2} \left(\underline{a}\ \underline{dx} + \underline{b}\ \underline{dy} + \underline{c}\ \underline{dz} \right)$$

in which P represents the costprice of the product; t_1 and t_2 the time limits within which the product is made; x the amount of matter used; y the labor involved; and z the money needed for the production. In verbal form, the definition of the "costprice" of a product is the equivalent in money of all the elements of matter, labor, and money, which are used between the time limits of the thing produced. To calculate the costprice of a machine, for example, the elements are:

Matter: bolts, rivets, shafts, bearings, etc.
Labor: drilling, milling, drawing, etc.
Money: depreciation, rent, insurance, wages, etc.

In formulating this conception, Mr. Vanderjagt had to ask and answer the following questions:

1. Is it possible to make a brick without using time?
2. Is it possible to make a brick without using matter?
3. Is it possible to make a brick without using labor?
4. Is it possible to make a brick without using money?
5. Is anything more needed to make a brick which cannot be included in the four conception of time, matter, labor, and money?
6. Is the amount of time needed to make the brick an exact amount?
7. Is the amount of matter used an exact quantity?
8. Is the amount of labor used an exact quantity?
9. Is the amount of money needed an exact quantity?

In so far as these questions can be answered definitely, the costprice can be determined in a precise fashion.

Now the reader may be wondering what place these matters have in a philosophical discussion of ideological conflicts. The answer is that in this theory of value we may find the beginnings of a viewpoint which will help us clarify some important questions of a broader nature, as we shall soon see.

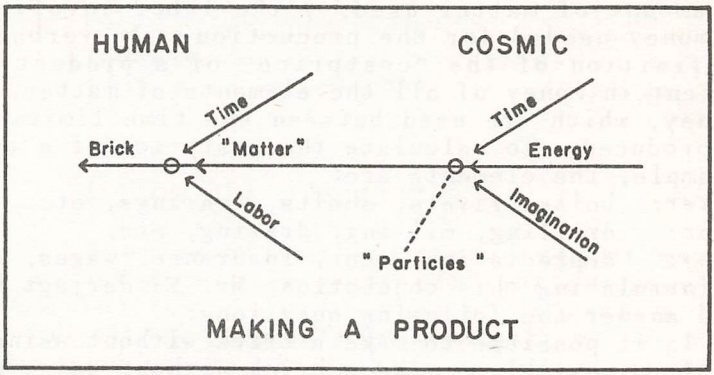
The broad merit of Vanderjagt's approach is that it provides a kind of "unified field" theory for social science. This comparison is not accidental. Thanks to the work of Einstein, it is possible to write the equation:

Matter = condensed energy

Now, on the basis of similar ideas in economics, we may write the equation:

Capital = condensed labor

Here, of course, we have in mind our previous diagram, "MAKING A UNIVERSE," where the "product" is cosmic in nature. This is brought out in the following diagram:



The reader will observe that the fundamental idea is that just as Marxist materialism and Christian theism might compromise on a Supreme Imagination whose nature is directed energy (guiding fields), so Marxist economics and free enterprise economics might co-operate on the basis of a new *labor theory of value* which renders unto labor the things which are labor's and unto the owners and/or managers the things which are theirs. Is this a feasible theory? Let us look into it.

The most significant thing about Vanderjagt's theory of economic value (costprice) is the specification that in computing this value *labor must be considered as of three sorts: mechanical, manual, and mental.* The costprice should include these three items, along with the cost of materials, and so forth. Ordinarily the item of labor is thought of in terms of the first two, mechanical and manual labor. But for Vanderjagt, "mental labor" or "imagination" is equally important. The costprice, thus

established by the full formula, should be the basis for evaluation, and this is not determined merely by the intersection of supply and demand curves as these are traditionally interpreted.

Now before supplying my own additions to the theory as thus far elaborated, let me make one observation on Vanderjagt's formula.

Consideration of Vanderjagt's equation brings out the fact that it refers not merely to the "price" of the product in a narrow sense, but it includes also the "value" according to the judgment of the person who fixes the money value of such items as manual and mental labor. That is, the concept of costprice is a mixed notion which includes an ethical evaluation. This is not objectionable, for what we need in a science of political economy is a bridge that can span the gap separating economic values from social values. Furthermore, such a complex value could establish a price which would not respond so readily to variations of supply and demand; it could therefore function as a kind of price stabilizer.

VI. VALUES: ECONOMIC AND SOCIAL

Keeping in mind the above considerations, further thought suggests that the great virtue of Vanderjagt's analysis is that *it introduces in a clear cut form the role of creative imagination in industry and technological advancement.* But whose imagination are we here dealing with? Of course the imagination of the individual innovator who makes his personal contribution. Less obvious, perhaps, but more important, is another contribution--the imagination of the whole human race in putting at the disposal of any later generation the funded knowledge of all past cultures.

Whose "imagination" made it possible to create the new invention: the steam engine, the electric motor, the atomic pile, and the rest? Mr. Vanderjagt's idea was that the individual person, the scientific genius, who presents the discovery is contributing his imagination to the creation of the product. But, I ask, if Thomas Edison uses the ideas of Michael Faraday, and both of them in turn are applying principles established by Galileo and Archimedes, where shall we stop in this regress of indebtedness?

Since knowledge is a social achievement, socialism in industry seems ethically sound because it (industry, as applied science) is based on the socialistic premise

that "truth--for example, the principle of the lever--belongs to all who can use it." I don't see how it is possible to argue that ethical truths (for example, the teachings of Jesus or Socrates) belong to everyone, whereas scientific truths, such as propositions concerning the release of atomic energy, belong to a state, or a corporation, or a private individual.

The principle concerning the social ownership of scientific truths should apply in Soviet science as well as capitalistic science. If the Soviet scientists want to restrict the benefits of Soviet science to Russia, then they must argue the false proposition that they are making use only of discoveries by other Soviet scientists. This is in fact the way their minds are inclined to work at the present time. Of course it is equally true that if the officials of the Government of the United States, as a capitalist nation, intend to limit the benefits of atomic energy developments to the United States, they cannot on ethical grounds permit their scientists to borrow from the funded capital of human knowledge to create bigger and better instruments of destruction. Einstein did not labor to bring into being a "capitalistic science," any more than Darwin to create a Nazi ideology of the superman, or Pasteur to create a Marxist medicine. This means that any group, nation, or individual is to be condemned if it borrows truth (validated propositions) from the *Funded Knowledge of Humanity* without returning to this socially accessible pool of knowledge the equivalent of what has been borrowed.

VII. THE FUNDED KNOWLEDGE OF HUMANITY

All existing systems of economics seem to ignore this debt we owe to the past. The Marxist theory of value overlooks any component of creative imagination; and the "costprice" of a product in a capitalistic economy also has no reference to the role of social imagination. But if we apply Korzybski's theory of "time binding" as an explanation of what makes society what it is today, should not the costprice of a new article have reference to the imagination of the whole human race, the countless contributions of unnumbered ancestors who have added their mites to the sum total of human achievement?

If this is sound as an ethical doctrine, then imagination should include the accumulated values (a new kind of "unearned increment"), plus the value added to the product by the innovator who puts in his relatively small improvements. If this is correct, isn't the accumulated

capital super-national and super-class, so that the "costprice" for a marxist or a capitalist should be erected upon a base that is so broad that we can all stand upon it?

How this capital of the "collective human imagination," which goes into the making of any product, is to be weighted is a question to which I do not know the answer. Since it cannot be paid to past generations of men who earned it--they being one with the dust of the Caesars--perhaps a toll should be levied on all products and added to an international fund to subsidize organizations, such as UNESCO, dedicated to science on an international level. Perhaps an international bank to finance the World Health Organization might be founded. This would not add greatly to the price of any article, and would, like "God's acre," keep men conscious of their indebtedness to the best of the past. Such a common base could serve as an economic stabilizer as well as a cultural solvent of ideological differences.

VIII. THE PROSPECTS FOR SOCIALISM

Of course we are not so naive as to suppose that pragmatic socialism can or should be introduced into the United States overnight. Socialization of big industry (we are not here concerned with small businesses) should be a long range program, backed up by the kind of education that, for example, the Fabians provided as a precondition for their kind of socialism.

However, we must also guard against the opposite danger of treating socialism as utopianism. We must recognize what socialism has already achieved in Sweden, Norway, the United Kingdom, and elsewhere. Canada has already provided a kind of test case. She has a transcontinental railway already socialized, as well as the Canadian Broadcasting system, and other projects. What we are saying, therefore, is that while we have treated our third, middle-of-the-road possibility as a theoretical alternative, the fact is that it has passed this theoretical stage and is already operating. True, in this country, except for TVA, the ground is hardly broken. But the harvesting will come in time.

In terms of long time developments, the key fact is the necessity for a transition from a capitalistic to a collectivistic economics. There is good reason to believe that capitalism's industrial set-up makes collectivism of some kind likely. Collectivistic and cartel capitalism are anything but "free enterprise" and only socialization

of these modern giant corporations can protect "individualism" from the power of monopolies. Socialism seems to provide the answer to this dilemma.

IX. SEMANTICS IN SOCIAL THEORY

The previous reflections on the social background of human knowledge and intellectual progress bring us to our last topic.

In all the talk about the "rights" of labor and the "rights" of management, few persons realize that we are here trying to deal with non-elementalistic functions in terms of an elementalistic analysis. Obviously, what we need is a more thorough study of such fundamental concepts as "labor," "capital," "money," "management," and the rest, from a semantic point of view. In thinking about the general problem of human culture, the scheme first presented in 1940 to the *Los Angeles Society for General Semantics,* was developed. It is here presented as TABLE III.

A study of this scheme will reveal that we have visualized human social evolution as conforming to three levels of orientation. The value of such a scheme, in so far as it adequately represents the trends of social evolution, is that it calls attention to the fact that the meaning of the word "labor" is not absolute and invariable, but changes with social development. For example, on our first level of society--what we termed *primitive* or *pre-Aristotelian culture* , "labor" was not specialized out in the way in which it later came to be. In the primitive communal order no one regarded "labor" in terms of the connotations of "indignities" such as were later acquired.

The second level, the *civilized era of human culture,* we have described as the Aristotelian level of orientation. By that time the system of slavery in Egypt had already established a stereotype of elementalistic (fragmented) specialization. The immense buildings erected by Asiatic despots and by the Egyptians were the products of armies of slaves, to be duplicated later in the factories of the Roman magnates, and in the silver mines of Spain. As we know, the upper class (aristocracy) of the Greek city states was possible only on the basis of slavery.

It is possible that the Platonic and Aristotelian differentiation between the separate functions of the soul, with thinking or intellectual activity as the manifestation of the immortal part (the most god-like),

TABLE III

LEVELS OF HUMAN ORIENTATION

I. PRE-ARISTOTELIAN OR PRIMITIVE ORIENTATION

(Began perhaps 500,000 years ago and terminated with early civilization of 5,000 years ago.)

One-valued semantics. Pre-logical period. Emotional elements predominate. Sub-vocal (gesture) communication. Old brain activity (thalamic). Assumption is: "Everything is everything else." Poor differentiations. "Mystical participation." No "laws of thought"; no categories, such as "space," "time," "matter" and "causality." No fallacy of elementalism. Group consciousness strong--no individualism (or "egoism").

II. ARISTOTELIAN ORIENTATION

(This is the semantics of Western European and American culture, about 3,000 years and still used.)

Two-valued semantics. Period of restricted identification. Emphasizes "reason" and excludes "emotion" from science. New-brain activity. Highly verbal and cortical. Abstract symbolism enters. "Law of identity" appears. Scientific categories, such as "space," "time," "matter," "causality" are developed. Fallacy of elementalism appears. Science becomes A-E-N. Axiom is: "This is this, that is that, this is not that." Social individualism (egoism) appears.

III. NON-ARISTOTELIAN ORIENTATION

(For a coming, or new civilization -- yet to appear (?))

Multi-valued semantics. No fallacy of identification. Results in a psycho-logic, a fusion of "reason" and "emotion". Cooperation between cortex and thalamus ("head and heart"). We recover some of primitive man's sense of the "unity of nature." Coordination and synthesis of knowledge. Fallacy of elementalism is overcome. No splitting verbally of things that are not split factually. Space-time universe. Science is A-E-N. Social egoism is subordinated. No racial-religious identifications. A scientific Humanism appears. Planetary Planning.

superior to the activity of the slave class doing the manual labor, had much to do with fixing the odious connotations the word acquired in subsequent European civilization. Today this snobbish attitude toward manual labor still is with us.

According to our scheme, the third or coming level of orientation will be non-Aristotelian. This will be an integrated level. Until our fragmented society learns to respond in non-elementalistic patterns, we shall not get away from vicious abstractions wherein we set up the oppositions between "labor" and "management," "work" and "leisure," "art" and "life," and the rest. In passing it should be noted that abstracting is not harmful when we know what we are doing; it is only unconscious abstraction that leads to elementalism.

There is a theory that the higher the level of abstraction the more difficult it is to transplant the product of abstraction. In support of this conclusion it will be pointed out that the wide diffusion of folk dances is an example of transplantation of elements of a lower-level culture; whereas the classic German symphony and Italian opera, being higher-level abstractions, were never completely absorbed by any alien culture. This generalization is probably sound in art and literature. But in an age of radio, airplanes, and the like, the one thing which the whole world must study and assimilate is science--and so we find Chinese, Hindu, Japanese, and other students out of sheer necessity studying western mathematics and mastering the most difficult high-level abstractions. Now it remains for us Westerners to learn something of the abstractions and insights of Oriental philosophies and religions!

The reflections on the increasing role of "science" in society suggest many important problems. The fact that science, both in terms of origin of ideas and in terms of the social impact of the achieved results, is increasingly linked to a supporting framework of society has many implications. The fact is that science has grown so rapidly in the last several centuries (at an "alarming rate," some are tempted to say) because the American revolution and the French revolution introduced us to an age when it became possible to tap the brains of the multitudes. All men are now adding to the collective pool of human knowledge, and all men are affected by the terminal consequences as they flow back into that pool. All men therefore have a right to share in the benefits of science. In return, all men are under obligation to see to it that science in its impacts functions as a blessing rather than a curse to mankind. The future

of the world can be made secure only when scientific methods are applied in all fields to recreate our social structure. It is especially in the controversial field of human values that a scientific humanism may make its greatest contribution. That these values are not merely ethical and social in reference, but may include also the values which the arts have sought to express and communicate is the burden of our next chapter.

CHAPTER VII

MUSIC, MATHEMATICS, AND COSMOLOGY

From Harmony, from heavenly Harmony
This universal frame began
When Nature underneath a heap
Of jarring atoms lay
And could not raise her head.
The tuneful voice was heard from high,
Arise, ye more than dead!
Then cold, and hot, and moist, and dry
In order to their stations leap,
And music's power obey.
From harmony, from heavenly harmony
This universal frame began:
From harmony to harmony
Through all the compass of the notes it ran
The diapason closing full in Man.

-- John Dryden

I. THE PYTHAGOREAN THEOREM

The doctrine that the structural framework of our universe represents a kind of frozen music, that in general there is a common substructure for music and cosmology, is a theory we are here proposing. In this study, we are investigating:

"Laws of form and meter just
Orb, quintessence, and sunbeams,
What subsisteth, and what seems."

Such an inquiry should reveal many things: the relation between music and poetry and nature; moreover, it should teach us that --

"Heard melodies are sweet, but those unheard
Are sweeter, therefore, ye soft pipes play on."

But, as the poet continues, this is music not to the sensual ear; rather it is a song sung to the spirit.

This fundamental insight that in truth "nature lays her beams in music," culminates in a faith that transforms mere metaphor into literal reality; so that to the believer:

"Nature is a harp of seven times seven strings
Of which, by God's own hand, is gently played
The ever-varied music of the spheres."

Thus, to the sensitive personality, nature works a creative magic of music which the errant soul of the poet, lost in the vast studio of the universe, would dissolve into the Undifferentiated Ocean of Electrical Energy, touched by the finger of God:

"And God Said, 'Throb,' and there was motion
And the vast mass became vast ocean."

The notion that nature is constructed according to an architectonic which is exemplified by both music and mathematics was first formulated in Occidental thought by Pythagoras. This ancient Greek mathematician, philosopher, astronomer, and founder of a school of mysticism, saw in number patterns and geometrical ratios the explanation of all natural phenomena. He made discoveries concerning the mathematical basis of musical harmony, and in fact invented the musical scale which was destined to evolve into the generally accepted European scale of music. It is not surprising, therefore, that the man who first discovered the relation between the length of vibrating strings and the corresponding tones they give off should hit upon the idea that the stars and planets, like vibrating bodies generally, should give off musical notes as they revolve and produce a beautiful, even if humanly inaudible, "music of the spheres." Thus the stars in the heavens do indeed sing together, and since

the origin of harmony is divinity, one may say, in the language of later poetry, that we have here:

> *"Authentic tidings of invisible things;*
> *Of ebb and flow, and ever enduring power;*
> *Of central peace, subsisting at the heart*
> *Of endless agitation."*

The Pythagorean conception of cosmic harmony as the expression of a "music of the spheres" is celebrated by Goethe in the opening passage of Faust:

> *"The sun, in ancient guise, competing*
> *With brother spheres in rival song*
> *With thunder-march, his orb completing."*

But the more daring doctrine that all nature is a manifestation of a music moulding cosmic forms is suggested in the passage from Dryden which opens this chapter, no less than in the passages quoted from Emerson here and there in the present chapter.

This ancient Greek speculation has had a long, if not always respectable, life history. Pythagorean mysticism became the prototype for later variants of the doctrine that "God geometrizes," and this divine improvisation could be discerned in the book of nature which was writ in mathematical symbolism. Therefore Kepler could exclaim, after discovering the three laws of planetary motion, "Oh Lord, I think Thy thoughts after Thee!" This harmony frequently was associated with spirits dwelling within the forms of nature, as is illustrated by the doctrines of astrology and alchemy.

Among moderns, testimony to the doctrine of metamorphosis through the melodies that lift forms from one level to the next can be found almost anywhere in Emerson. No one has surpassed this modern seer's statement of the Pythagorean theme. For example, the idea of an unwritten music moulding the forms of nature is clearly enunciated in *Monadnoc,* as follows:

> *"For the world was built in order,*
> *And the atoms march in tune;*
> *Rhyme the pipe, and Time the warder,*
> *Cannot forget the sun, the moon.*
> *When they hear from far the rune,*
> *Orb and atom forth they prance;*
> *None so backward in the troop,*
> *When the music and the dance*
> *Reach his place and circumstance,*
> *But knows the sun-creating sound,*
> *And, through a pyramid, will bound."*

Thus Emerson brings us tidings of a universe "by one music enchanted, one deity stirred," which speaks a universal language through sun and sound, the eternal sky and morningbird, which floats upon the wind and reveals itself in the fragrant solitudes, the journeying atoms, and the frolic architecture of the snow. Laws of form and meter are like a melody born of melody, revealing divine influences in the axis of a star no less than the sparkle of a spar. The poles of the universe, from globe to galaxy, are but beads on a rosary of cosmic prayer, an alchemy of music condensed in cosmic structure. As Emerson sings it:

"For Nature beats in perfect tune,
And rounds with rhyme her every rune,
Whether she works in land or sea,
Or hide underground her alchemy.
Thou canst not wave thy staff in air,
Or dip thy paddle in the lake,
But it carves the bow of beauty there,
And the ripples in rhymes the oar foresake."

But some will say, even though this is good poetry, what has it to do with science! The ridicule from the side of the scoffers -- even from his own fellow scientists -- which greeted Sir James H. Jeans's proclamation that the Supreme Architect of the Universe is a mathematician seemed for a while to provide the death blow to the poetic mysticism and Pythagoreanism of Sir James.

That there is merit to this view -- contrary to the witticisms of some skeptics -- is what I shall attempt to show. In the present chapter I shall defend the thesis that the universe is constructed along the lines of mathematical-musical patterns. When I do this, I am not unmindful of the fact that the Euclidian frame of space and geometry is now discarded in favor of a more general approach. But even after rejecting the limited frame of reference of the Euclidian-Newtonian world-view, we still find it possible to support the Pythagorean theorem. What is here being advocated is not a recrudescence of Greek logic and mathematics, but a modernization of the Pythagorean-Platonic mysticism which rises above the language of merely conceptual constructions to the level of a poetic insight into the unity of nature -- something we have already set forth as the goal of social evolution: a transmutation of the sense of "mystical participation" of earlier times as sublimated by the scientific findings of modern empirical science.

The present thesis is that it is perfectly feasible, using contemporary data, to extend our knowledge of the universe to include the Supreme Architect of Plato and Jeans as the Archetypal Influence Who functions through the properties of the Cosmic Energy Continuum to create -- give emergent being to -- the forms of life and mind. As we have indicated in previous studies, the mathematics necessary to this new synthesis is spherical harmonics, which unites the laws of musical harmony with those of electricity and the flow of heat. For this idea I am indebted to Mr. Fritz Kunz.

The burden of our argument is to demonstrate the following correlative propositions! (1) *that the processes of nature tend to settle down into recurring rhythms, and* (2) *that non-rhythmic processes tend to be eliminated in the struggle for existence that is constantly going on within the movement continuum.* In carrying forward this program, we start with the generally accepted thesis of non-Euclidian scientific thought that cosmic space-time is Riemannian and them apply this not only to the entities of physics, but also to biological organisms and psycho-social phenomena, in a manner to appear shortly.

II. HARMONIC RESONANCE IN PHYSICAL SCIENCE

In developing our theme, we shall constantly refer to "resonance" principles. This means -- as the physicist points out -- that when a rhythmic force impinges upon a material system it produces observable effects when the system has constituents capable of vibrating in rhythm with the original force. That is, there is a "resonance" between the waves of the medium and vibration of the system when their frequencies coincide. This phenomenon is quite familiar in tuning forks which vibrate in "sympathy."

There are several ways in which the musical basis of electronic, atomic, and molecular structures may be exhibited. One such procedure is available in what is called *wave mechanics,* which deals with the ultimate constitutents of matter by conceiving "particles" as due to "interference effects," somewhat like "beats" in music, due to the superposition of groups of waves.

This impressive synthesis did not come all at once. No doubt, the first tentative gropings along this line were provided in the middle of the last century when Mendeleef presented his *Periodic Table* and verified Emerson's intuition that "the atoms march in tune," because

they form an octave system graded like the notes of a musical scale.

But the really impressive chapter begins with what above is referred to as "wave mechanics." The story starts with Louis de Broglie, who first saw the possibilities of bringing optics (wave trains) and the mechanics of particles together; and this proposed synthesis through the study of *phase waves* was the further extended when Erwin Schrodinger substituted the integrated system of *wave mechanics;* finally, to bring wave mechanics into line with relativity theory, quantum mechanics theory was then generalized into a "configurational space" of many dimensions -- what might be called the "ghost realm" of higher-space mathematics.

Meanwhile the chemists have not remained indifferent to these developments in physics. Far from it! Not to be outdone, they worked out a theory of chemical affinity (valence bonds) along similar lines of "resonance" theory. Accordingly, not only on the level of ultimate "particles" (electronics, protons, neutrons, etc.), but even on the higher levels of atomic and molecular behavior, the vibrating centers which we think of as "material" structures have regions where there is an overlapping of wave functions, and these nodal regions of overlapping form the "bonds" of chemical attraction. Thus it becomes possible to derive the whole of valence theory from the quantum mechanical principle of resonance. This latter derivation is due in a considerable measure to the pioneering work of Linus Pauling, who sets forth this synthesis in his volume on *The Nature of the Chemical Bond.* In this fashion, as Professor Pauling says, the resonance theory of valence has brought unity into modern structural chemistry.

A kind of visual representation of these phenomena, though of an oversimplified form, has been provided by the demonstration by Victor Goldschmidt who has shown that if the intervals at which atoms in crystals are spaced could be connected by strings under tension, the resulting notes from them would be musical. Thus does nature reveal a musical mathematics in atomic and molecular compositions.

Before leaving this rich kingdom of inorganic harmonies, let us glance at one more example of intellectual synthesis. We are thinking here of one of the supreme generalizations of the human mind -- that presented in astronomy by Johannes Kepler when he formulated his three laws of planetary motion. This in itself was no small achievement; but when it was further revealed that the motions of the planets of our solar system are

related to the sun's rotation and regulated by electromagnetic laws, the insight into nature's unity was still further extended. Here we have in mind the fact that both Kepler and Descartes were influenced in their thinking by the work of their English contemporary, Dr. William Gilbert, and regarded electricity and magnetism as forms of vortical motions, and so it was natural that they (Kepler and Descartes) should suppose that electromagnetic laws regulated the behavior of the solar system.[1] Later Michael Faraday, Clerk Maxwell, Heinrich Hertz, and Sir Oliver Lodge extended this electromagnetic theory.

Today we know that both experiment and theory support the view that magnetic fields are generated by rotating primaries (sun, planets, atomic nuclei, and so forth). It is therefore proper that Kepler's laws should now receive electromagnetic interpretation. Indeed, Einstein has put the whole problem in a clearer light, especially in the latest synthesis which the author of the theory of relativity has propounded (1950).

III. PYTHAGOREANISM IN THE ORGANIC WORLD

Of course it is one thing to apply harmonic analysis to non-living systems -- but how about living systems? Do they also obey the principles of music and mathematics? The answer here is that in the first place the gap between the inorganic and the organic is now more shadowy than was formerly supposed, and that we do in fact find it possible to apply many of these principles.

Among those who have done considerable work on the giant protein molecules so fundamental as building bricks in inorganic systems is Dr. D. T. Svedberg, Swedish Nobel prize winner, who has tried, with marked success, to show that it is possible to explain in exact mathematical terms -- in terms of atomic energy levels, electron spins, and so forth -- what happens in biological systems. This suggests that all the elementary phenomena of life -- even the fertilization of an ovum by a spermatozoon -- conform to the laws of quantum mechanics.

Up to this point, however, what we have stated is in very general terms. Fortunately, it is possible to support these generalities with specific details, in some cases at least. Even such a fundamental but hitherto unexplained phenomenon as biological mutation begins to

[1] See the brief but interesting article by Cornelius O'Connor on "Solar Rotation and Kepler's Laws," Science, Vol. 110, 1949, pp. 292-293.

yield up some of its secrets. Now that we can regard the gene as a complex protein molecule (a nucleo-protein), mutations may be conceived as arising out of a transition from one stable form of protein system to another, but isomeric, form of the same molecule. This idea, first proposed by M. Dehlbruck,[2] promises to bring biological mutations under broader principles of quantum mechanical resonance as embodied in Pauli's "exclusion principle." Of course the chemical basis from this type of biochemical process is provided by the resonance theory which explain valence bonds.

Further (though still incomplete) confirmation of such intriguing lines of theorizing is supplied by the distinguished geneticist, H. J. Muller,[3] who in his lecture on "The Gene" leans strongly toward the idea that vibrational attractions are involved in the behavior of chromosomes. Thus resonance still plays a role, whether the genes or the chromosomes be regarded as the source of biological mutations -- and this is quite in line with current discussions of "enzymatic action at a distance," wherein it appears that this type of phenomenon is explicable only on the hypothesis that the enzyme and its substrate form a resonating system.

Clearly the next step is to deal with the entire organism as a resonating system. In such a conception one must, among other things, pay attention to the possibilities of the brain as a resonator which may exhibit principles of harmonic vibration. That such theorizing has some of its foundations laid in facts is made clear in one way by the investigations of Dr. William Seifriz of the University of Pennsylvania. At a meeting of the National Academy of Science (Philadelphia, 1940), Dr. Seifriz reported on the streaming flow of protoplasm and showed that living tissues have a major rhythm and three subordinate rhythms. These were said to be due to the expansion and contraction of large folding molecules such as have been studied by Dr. Svedberg.

In reviewing the history of this idea, it appears (so far as I can discover) that the conception of the organism as a whirlpool -- which is a kind of remote ancestor for the resonance and rhythm theories of protoplasm -- is at least as old as Cuvier, though this idea remained little

2 Cf. Cold Springs Harbor Symposium on Quantitative Biology, Vol. 9, 1941, pp. 122-126.

3 Proceedings of the Royal Society of London (B), 1947, pp. 1-34. On these matters, see also Marginalia, by G. Evelyn Hutchinson, in the American Scientist, Vol. 35, 1947, p. 253 ff.

more than an analogy until F. Houssay superimposed upon it the notion of vibration. The General conception of the organism as a vortex with vibrations was carried further by George Bohn in his book, *La Forme et le mouvement: essai de dynamique de la vie* (Paris, 1921). Here Professor Bohn started with molecules of living substance, the inherent vibrations of which produce a system not merely vortical but polarized, manifesting its internal forces through oscillations in space and time.

Such schemes are speculative, but perhaps a bit of verification is provided by the recent work, previously mentioned, which shows that molecules execute various types of vibration, sometimes even giving rise to "overtones," so that, for example, the notion of a complex protein molecule, composed of amino acids, undergoing resonance vibrations, is not without experimental support. Further applications of such ideas in Lapicque's theory of *chronaxy* and the work of Dr. Paul Weiss, with his theory of nervous excitation in terms of the principle of vibration resonance, were discussed in detail in the author's previous book on *Philosophy and the Concepts of Modern Science* and in articles therein referred to.

We have already mentioned the possible applications of wave mechanics to biological systems and also to the notion that resonance phenomena are exhibited in brain processes. Thus by a series of leaps it appears possible to pass from physical theory where, on the lowest level of nature, scientists are working out undulatory theories of "particles," to the higher level of the biological realm where thinkers are exploring the possibilities of interpreting the entire organism in terms of wave mechanics, where (as the present writer has proposed) the fundamental rhythm of the organism is the curve from birth to death, with the activities of the individual cells within that rhythm being treated as analogous to the "eifenfunctions" of wave mechanics.

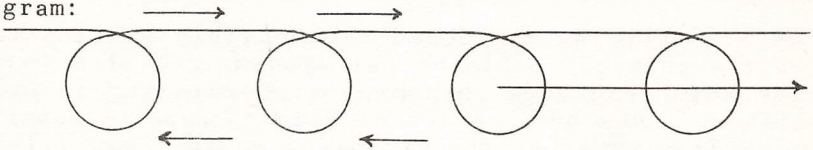
Then by a further leap of the imagination we pass to the highest domain of psychical realities. Here we again employ the general theory of harmonic analysis, and this enables us to make rich use of the complete repertoire of rhythmical phenomena -- wave trains, tuning, Doppler effects, fundamentals and overtones, interference patterns, summation and difference tones, and the rest. This homology leads us to the use of such phrases as the "music of consciousness," the "melody" of a response in time, and so on. In such a scheme, in which cortical brain processes are dealt with mathematically in terms of the components of a Fourier's series, conscious

experiences are interpreted after the fashion of the "fundamentals" and the "overtones" of the neural periodicities of cells (or groups of cells), which periodicities may be studied objectively in the "bioelectric potentials" recorded as electroencephalograms. Thus, in our view, the brain is not only what Pavlov calls a harmonic analyzer, but it is also a harmonic integrator -- perhaps of the sort which an ancient Pythagorean speculator had in mind when he described the soule as the "harmony of the body." This thought is evidently what Edmund Spencer poised when he wrote:

For the soule the bodie forme doth take
For soule is forme, and doth the bodie make.

IV. THE SPIRAL FORMS IN NATURE

Among those who have given a discerning interpretation of the wisdom of life is Mary Everest Boole. As she has pointed out, the symbol of the dust storm gives an excellent analogy for mental progress. Note the following diagram:



Here, by approaching your opposite, you find the center. "He does not retrace his steps, who, by staying at the still center, understands the force being exerted at each tangent to the circle." Mrs. Boole evidently means by this that *the still center is found through the union of opposites,* as we previously pointed out in the book, *A New Earth and A New Humanity*. And, we here ask, does not this also represent the forward movement of the world of emergent evolution, the process-growth whereby higher rhythms in nature are "congealed" in the hierarchy of biological advance? The same process is at work on the psychological level, for the logarithmic curve is now used to plot the goal gradient of human effort (Cf. *Psychological Review,* Vol. 39, 1932, p. 33).

Before leaving the subject of spirals in nature, let us consider further the psychology of thinking by means of which we conceive such pictures of reality as we have examined. Here we find it particularly instructive to glance at the stimulating book by Dr. Paul Schilder, *MIND: Perception and Thought in Their Constructive Aspects* (1942). Dr. Schilder here deals with the

psychology of geometry. He points out that in the development of experience in children we must not separate perception from movement, since there is no perception without motility, and that genetically the psychological unit is not a point, nor even a straight line, but the primitive units are loops and curves. Experience with children clearly shows that the curve precedes the straight line, and the predominance of curved lines probably has a relation to the fact that arm movements are related to a curve.

Dr. Schilder refers to the work of L. Bender who has supposed that visual motor gestalt patterns are dependent upon principles of constant motion of a whirling (vortex) type, with an associated radiating component. The idea that movement is the basis of the organization of the optic field, and that internally organized gestalten evolve genetically through a progressive integration of functions may give us the psychological basis for Mary Boole's "spiral action of time" way of thinking as well as for Alfred Korzybski's theory of "time binding" in terms of the screw spiral. Let us pause here long enough to examine the mechanism of *time binding*.

V. THE SEMANTIC THEORY OF TIME BINDING

In his prodigious and difficult work, *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics,* Alfred Korzybski repeatedly points out that in his theory the notion of *time binding* is connected with the conjugate formulations of *non-elementalism* and *non-linearity.* Time binding as a typical function of the human nervous system is not a *plus* affair; it is not a sum of part-processes. The superposition of new neurological processes on old ones alters the character of the whole organism, "Thought," for example, is a manifestation of the organism-as-a-whole-in-an-environment, and like all such functions should be studied as a non-additive affair.

According to this view, it is man's capacity for forming higher-order abstractions which is uniquely responsible for the fact that men *can* be time binders. But "man" is not always a time binder. When he functions like a lower animal and *copies* their reactions (substituting *signal responses* for *symbolic functioning*), he is not *ordering* his higher-order abstractions. To order his "ideas," he needs a structural basis for the stratifications of levels such as the "spiral theory of time"

provides. The manner in which this is developed is most interesting.

Starting with the proposition that every fact of nature is a space-time fact, Korzybski concludes that the space-time continuum must be taken as the basis of organism-as-a-whole processes. Einstein first pointed out the importance of non-additive relations in physics in connection with his rejection of the familiar formula for the addition of vectors -- i.e., the formula for the compounding of velocities for light -- but now Korzybski calls attention to the fact that organic and social relations are also non-additive. Thus the world about us, no less than the world inside our skins, turns out to be non-summative in some of its fundamental aspects.

Man's higher abstractions represent his "cortical quest for invariance," and as such they easily assume a static nature. But modern mathematics provides us with a means whereby we can translate the language of the static into dynamic, and vice versa, for relativity theory is a means for transforming three dimensional dynamics into four dimensional statics through the handling of the time axis of a dynamic world as a fourth coordinate of the space-time continuum.

Generally speaking, one may say that any "space-like" coordinate can be treated as "time" (or vice versa) if we change the language from static to dynamic (or vice versa) by raising or lowering the level by one dimension. For example, as Korzybski points out, a vibrational motion in one-dimensional space becomes a wave-line in two dimensional space-time, and a flat circular orbit in two-dimensional "space" becomes a helix in three-dimensional space-time. The significance of this, *showing how a dynamical circular motion becomes a static (stationary) cylindrical helix (or screw line) in three-dimensional space-time, is especially important when we recall that the equation of the circle and the spiral are non-linear, non-plus equations, and then connect this with the further fact (already noted) that in the "spiral theory" we find the structural basis for the stratification of levels or orders which is exemplified by the functioning of the human nervous system.*

We see, therefore, that the activities of the human nervous system are represented geometrically as a spiral, or helix, with the time coordinate designating the progressively higher levels of organization whereby lower-level abstractions are integrated into higher-level *dostrinal functions* (Keyser) or *system functions* of H. M. Sheffer. In this manner Korzybski generalizes the

structural assumptions of semantics into fundamental principles for all science.

Thus as we see, many people today are struggling to find the proper methods and media to express this sense of a creative musical mathematics -- the feeling of an underlying harmony which is already structuralized in the physical and biological domains of nature and which yearns, so to speak, for a similar embodiment in an analogous social orchestration. This straining aspiration may well lead to the fabrication of some new medium of expression, before it can find its full consummation. Among those laboring in this field to whom we have already made reference is Fritz Kunz. In addition, we shall glance at the parallel efforts of two other investigators: Dane Rudhyar in the remainder of the present chapter, and the Schillinger system of musical composition in the following chapter. In the mean time, here and there in our own speculations, we are interspersing bits of theorizing of our own, aimed at bringing together some of these tangled threads to weave a more integrated pattern out of the fugitive efforts of others.

VI. A MODERN PYTHAGOREAN

Among the investigators working along lines similar to our own is Dane Rudhyar, a well known writer also imbued with the sense of harmony in the universe. Mr. Rudhyar is working in the overlapping cultural and artistic fields, seeking common and reliable principles in each. His ideas in this domain are presented to me in the form of a communication inspired by his reading of my own volume, *The World Sensorium*. Beginning with his reaction to the concept of "emergent evolution," which carries a heavy burden in my own argument, Mr. Rudhyar soon gets around to the bearing of these matters on art principles. In the latter part of his excellent statement he relates his own ideas on differentiation and integration to the subject of "descending" and "ascending" harmonic series. But before coming to that, here is what he has to say in a more general way:

"The concept of 'emergent evolution' is, it seems to me, the foundation of your particular approach to the idea of an organismic humanity -- which in turn leads to the goal of a World Sensorium. Any discussion of your book thus should rest on an acceptance, dismissal, or modification of this concept of an emergent evolution. It is a fascinating concept; but much as I have tried to

accept it fully, I am again and again forced inwardly to consider emergent evolution *as only one part of the total world-process.*

"As far as I can see, the concept is based on the holistic series of material aggregates from atoms (or before) to molecules, cells, organisms, personalities -- and in your opinion, beyond this, to humanity-as-organism. We perceive such a series and we *interpret* it philosophically as the visible expression of a universal process. If we merely said 'a' universal process, this would be unchallengeable, but to say 'the' universal process is perhaps taking too much for granted. It is above all not to recognize the existence of another cosmic series of opposite *direction.* I refer to the series: finite universe, galaxy, star-group, solar system, planet, biological species, and the individual.

"In this latter series the steps flow from one another *not* according to an integrational process of ingathering elements in ever more inclusive wholes, and of spatial expansion or multiplication of those wholes, but instead according to a process of differentiation, concentration, limitation, and increased exclusiveness. A galaxy differentiates into and gives birth to stars, suns differentiate and condense into solid planets, out of the planetary womb emerge plant and animal species, out of mankind and out of tribal society emerge individuals who are mutually exclusive in character and who glory in their identity as *unique* beings. Here, then, we see differentiation and a certain kind of emergence -- but characteristic of this emergent development of the more universal and larger unit into smaller and more exclusive entities is the fact that the new emerging units remain *within* the field of influence (the space) of the previous and larger one, even after having become 'differentiated.'

"To be brief, I feel that if we generalize and interpret the 'ascending' series of *integrating* wholes from the smaller to the larger into the concept of emergent evolution, as you do, we must then generalize the 'descending' series of *differentiating* wholes (from universe to individual). We might speak of 'emergent involution,' or 'immergent evolution,' but I would rather speak of this second cosmic stream or process in different terms, for I believe that the two series do not really deal with the same type of factors. While atoms, molecules, cells, organisms, are to be considered as 'material aggregates' -- universe, galaxy, and down to individual selfhood constitute 'structures.' And I mean by structures an abstract matrix, a set of potentialities within a pattern of relationship.

"I see the two processes as synchronous and reaching to a point of confluence from which a new type of process develops: this point is reached when *one* matrix structures *one* unique whole. This is the human individual. He is, as an organism, the end of the 'ascending' series from the atom up, and he is also the most differentiated of all matrix structures as an individual self. 'Personality' is a concrete emergent organism; but individual selfhood is also a structure, a formula of relationship -- not merely a synthesis of organic substances.

"The human individual is thus the point of confluence of two cosmic processes, and it *polarizes* the projection of a third factor, which is spirit or God-in-operation. I see this factor as a cyclically operating power. I see time as the substratum of actual 'cycles,' and space as the substratum of actual 'finite universes.' Time and cycles deal with the 'structuring process' of the cosmos (or the evolutionary differentiation of matrix-structures); while space and matter deal with the 'integrative process' of lesser into greater organic wholes. Spirit (or Logos) emanates Time to answer the 'need' of whatever cosmic substance is as yet unintegrated. 'Time is God's compassion for Chaos,' is the way I would put it.

"It seems to me that by trying to combine into one evolutionary development both the differentiating structural process and the integrative or holistic process of substance-evolution, the modern can be presented with a solution which is adequate. I am not sure that Stromberg's attempt at interpreting the wave-particle dualism in atomic physics as a soul-body dualism is entirely satisfactory, but it may be an excellent step in the right direction. On page 150 of your *World Sensorium* you pose the problem; but in doing so in 'scientific' terms, you seem to me to miss that which would simplify matters so much!

"We should not forget that we live within a planetary 'field,' a solar system field, a galactic field. These are our matrices. We see them because they are our matrices -- and we see of them only what, in us, corresponds structurally to them. If there is a relationship between earth-motions, solar system patterns, and the human patterns of personality development, it is not that in some mysterious way the 'stars' influence us, it is that we see of the world only those cosmic structures which are structuring us from within. Here we deal with the structuring or formative power of Time, which operates at once throughout the field. It is an 'internal' as much as an 'external' type of operation.

"One may speak of 'descending' and 'ascending' series. And I have done so, because I began with the study of music and Harmonic Series; and there I was amazed to find (a fact conveniently by-passed in histories of music) that *all archaic music was based on descending scales* (from treble to bass). The crucial 600 B.C. period (and Pythagoras) marked the beginning of the change of direction. For some time Greek music took on a horizontal direction, then finally the ascending slope to tone-sequences completely prevailed in the first century B.C. when the *calculations* of intervals superceded the *direct practice* with the tones produced by strings or pipes.

"Indeed music (as the art of *tone* and the applied philosophy of vibration and number) provides an extraordinary symbolism for world-understanding, provided one approaches it as the music of humanity (including archaic and Asiatic musics), and not merely in terms of an intellectualized European music from which all direct spiritual power has been emasculated. I am very much interested to see that your next book will be on music. I have written several books on it, one published in India on *The Rebirth of Hindu Music,* and a mimeographed study *(Liberation Through Sound)* of musical cultures in terms of the philosophy of intervals these cultures used.

"I do not know whether this long letter will make much sense to you. So much would have to be added to make what I have said really consistent and inclusive. Really, I am grateful to you for your "World Sensorium." It states so well a definite approach to the crucial problem of world-integration that it brings to my mind in sharper relief my own understanding of the evolutionary process."

I have quoted extensively from the above letter for several reasons. In the first place, Mr. Rudhyar's remarks contain many thoughtful reflections and much useful information. In the second place, I would like to use these reflections as a basis for some comments of my own.

My first observation is that Mr. Rudhyar's theses concerning the complementarity of the two processes -- the integration of the many into the form of unity and the self-differentiation of a more inclusive matrix into multiplicity -- is something I have long accepted as an essential part of an adequate philosophical theory, except that in my own case I have not been able to work this out in detail as apparently Mr. Rudhyar has. However, I am not entirely convinced that Mr. Rudhyar's

reference to the "ascending" and "descending" series in music (harmonic scales) is sufficient to prove the validity of his conception, even with reference to the more modest social -- as opposed to the much more inclusive -- cosmic evolution. But in any case, I feel that perhaps we should not call the process that Mr. Rudhyar describes as "involution" by that term. Differentiation and integration, we agree, are complementary movements in evolution, and if any symbolism is required to represent these parallel processes, we suggest that they may be pictured in terms of the caduceus. Even in what is going on now, the same duality of movement is apparent. For example, we propose to organize the whole world into one society, but equally portentous is the movement toward the fulfillment of the individual. Actually these two processes at all levels are interdependent. World organization depends on more fully evolved personalities, and freedom of communication between peoples is essential to the processes of individual self-evolution.

VI. PANTHEISM AND SCIENTIFIC HUMANISM

From the study of such contrasting evaluations as we have just surveyed men labor cooperatively to create the more inclusive synthesis. Thus through the never-ending elaboration of already-existing patterns of space and time as solidified in physical, chemical, and biological structures man proliferates still higher structures, musical in nature and progressively revealed in higher dimension which enrich the antecedent harmony. Here, then, we have the real substance of a scientific mysticism; this is pantheism as the religion of science. To scientific humanism religion is the sense of participation in a cosmic harmony; it is an experience, not a static theology, and any one who is sensitive enough to think and feel can have this "religious experience."

It seems quite probable that this cosmos in its immensity and sheer complexity is so vastly unknown (but not unknowable) that man will continue to feel this religious sense for a long time to come. The reason we will continue to feel the sense of awe in the presence of this constantly receding *Unknown Reality* is that, in the theory of emergent evolution, nature is continually producing new and higher levels of reality, so that nature promises repeatedly to be richer than our knowledge of nature. Indeed, up to now it appears that the more we know the more we see remains to be discovered: as we enlarge the outer boundary of the sphere of

knowledge, we enlarge the inner boundary of the unknown, that which still lies outside and beyond the known.

But why should man reverence this ever-present "unknown"? Why should we feel a sense of awe in the presence of that which we do not understand? The best answer I can give for the fact that man stands in awe of the mysterious is that we sense that only through the passionate search for truth can freedom be won. Freedom is connected with growth, and growth involves probing the as-yet-unknown, and that means trying to look into the future. And so it is the movement into the open future, the relentless searching into the unexplored wider world unfolding its secrets, which leads man to exalt the as-yet-undiscovered truth as his road to freedom. But this means that God, the As-Yet-Unknown Reality, is always Unknown, for when He becomes fully known he becomes Man.

The future of man -- indeed, the future of the universe itself -- rests with,man, or rather the god-like in man. When man has mastered the art and the science of bending the curve of history into the world-encircling spiral of a time-binding synthesis, he will have brought into being the higher reality of a still-emerging world organism. To fabricate this planetary being requires not only an ecstatic urge -- an energic streaming as a form-producing social orgasm -- but it requires also intelligent planning and a reconvergence of social symbols toward the apprehension of the oneness of life on a planetary level -- the symbolism of a creative semantics. That is to say, in order to attain planetary goodness and beauty, we need imaginative vision -- a vision so wide and so compelling that it may transcend all separatist tendencies and divisive limitations. Such imagination would be the incarnation of God in Man.

CHAPTER VIII

THE PLANET HAS A PLAN

".... Look how the floor of heaven
Is thick inlaid with platines of bright gold;
There's not the smallest orb, which thou beholdest,
But in his motion like an angel sings,
Still quiring to the young-eyed cherubins.
Such harmony is in immortal souls;
But, whilst this muddy vesture of decay
Doth grossly close it in, we cannot hear it."
-- Shakespeare

I. DEFECTS IN CURRENT HUMANISM

The present volume sets forth a synthesis of pantheism and scientific humanism. Such an integration of theories marks a departure from current varieties of humanism. The explicit criticism I make of much present-day humanism is that it is superficial, in the sense that it poses as "naturalistic" without having any systematic philosophy which gives its naturalism real content. This philosophy of nature is what I miss in the otherwise stimulating writing of John Dewey, Sidney Hook, Corliss Lamont, and the others who share the viewpoint of naturalistic humanism.

Much of our present-day humanism seems to me to be sterile, stereotyped, and arid precisely because it has lost contact with the springs of inspiration. I suspect that many of our nuclear physicists who are now "hitting the sawdust trail" might be salvaged for humanism if pantheism could be assimilated to humanism and made articulate to them as a solution to their problems.

When I contemplate the majestic order of nature, as exhibited in the periodic table, in the laws of planetary and solar system behavior, in crystallography, in the laws of Mendelian inheritance, and in the polarities and symmetries of social morphology, I am driven to conclude that there are integrative forces at work in the foundational structure of nature, the substratum of which is designated as the *harmonic base of the universe.*

In the preceding chapters we have already pursued some of these themes. In the present chapter we are carrying still further this absorbing investigation. More precisely, we are now concerned with the experience of beauty in the fine arts and with what that experience can teach us about the human nature and about the wider universe in which that "beauty" somehow inheres. This, of course, is a perennial problem. For us it is still a living issue, because of its importance for the type of pantheistic humanism we are here developing.

II. THE MATHEMATICS OF BEAUTY

The doctrine that the structural framework of our universe represents a kind of frozen music, that in general there is a common substructure for music and cosmology, is a theory that grips the mind. We have already observed that this notion that "the tapestry of nature is woven on a mathematical framework" -- as Claude Bragdon put it in his book on *Projective Ornament* -- was first enunciated in Western thought by Pythagoras.

An interesting feature of the record of speculation since the time of ancient Greek philosophy is the stubborn persistence of this idea of an unwritten music underlying the grosser forms of nature. The phoenix-like immortality of the concept of a half-revealed meaning of mathematics in nature and in art is illustrated in such modern expositions of the theme as we find exemplified in Jay Hambidge's book on *Dynamic Symmetry*, where the author shows how certain types of rectangles form the basis of Egyptian and Greek design. Along the same lines, we have the work of the late Harvard mathematician, Dr. George D. Birkhoff, whose book on *Aesthetic Measure* exposes the elementary geometrical forms which underlie ornamental designs and vase forms. In this connection, one thinks also of Prince Ghyka's unique studies.

Considering all this evidence as providing at least partial confirmation for the proposition that geometry, number, and other mathematical properties are the root of every kind of formal beauty, it appears plausible to conclude that the scaffolding which guides the artist in his creative work is indeed such deep-lying components as symmetry, order, relation, harmony and the like.

As an example of the possibilities of the mathematical analysis of beauty consider the role of the spiral in nature -- not the helix considered in the previous chapter

but the dynamic spiral. In his fascinating studies of spirals and their exemplifications in nature, Sir D'Arcy Thompson (in his book on *Growth and Form,* Ch. II) describes the spiral as "a curve which, starting from a point of origin, continually diminishes in curvature as it recedes from that point; or in other words whose radius of curvature continually increases." This dynamic spiral, as Dr. Harlow Shapley has pointed out, is found quite universally "from spiral nebula to spiral motions of electrons and other charged particles in the sunspots and solar vortices." Thus, as he points out, "the spirals of conchology and of plant stems, of the fine arts, and of terrestrial tornadoes, find counterparts in the astronomical field." As he notes, this logarithmic spiral is connected with the mathematical definition of electrical phenomena as well as the energy we describe as life and growth.

Now all this is very edifying to the students of esthetics and mathematics. But where does it leave the philosopher, whose concern is with the more fundamental question of the relation of mathematics to nature? Granted that beauty exists somewhere, subjectively in man or objectively in nature, does the applicability of the language and the techniques of mathematics to the objects of art in any way validate the Pythagorean-Platonic realism in its ancient and modern forms?

In order to give an answer to this question, let us first turn to one artist and see what light he may throw on this intricate problem. A musician may help us here, for his art is the most "subjective" or evanescent of the arts, and if he can make good his case, we have immeasurably strengthened the argument for the objectivity of the beauty of mathematical forms in nature.

III. MUSIC AND MATHEMATICS

In this chapter, devoted to synthesis, we are trying to bring together the loose ends of our discussion and add those extra ingredients which will cohere the parts and achieve something like an organic harmony of ideas. In order to present this integration of ideas, let us first turn to the theories of musical composition as expounded by Joseph Schillinger, an outstanding American composer of music.

This composer and theorist, along with the other figures of contemporary culture whom we have studied, might properly be called a follower of the Pythagorean philosophy. In him we find the currents of scientific

interests flowing strong and steady. Indeed, we find that Schillinger's concern for science culminates immediately in a body of musical composition which is supposed to be a test of the validity of theory itself. Let us therefore look into these theories.

Joseph Schillinger is known to the musical public for the development of the electronic instrument, the theremin; for his musical compositions; and for the theory of the mathematical basis of the arts which he has invented. These theories at many points run contrary to accepted notions. For example, as Schillinger points out[1], the musicianship which makes a true musician the creator of music is a group of abilities which are diametrically opposed to those usually claimed as the attributes of musicianship. The real qualities of musical ability are not such traits as extraordinary sensitiveness of hearing, finger ability, or mechanical memory. According to Schillinger, a true musician is a molder of sounds, and not a resonating chamber that reflects what comes into it. The creative artist is looking for new ways of expressing things that have perpetual significance to human beings. Therefore the artist must have immunity to other people's music. The attributes of musicianship -- according to Schillinger -- are as follows:

The ability not to be impressed too much by, nor remember too much of, somebody else's music.

The ability to construct new forms of sound in its flow.

The inventiveness and combinatory abilities in handling any raw material of intonation.

The kinaesthetic sense of sound in motion -- the sense which permits the composer to emphasize long periods of musical flow without ever having heard them before.

The sensation of tension and release as expressed through patterns of musical motion.

The sense of proportion in its mathematical meaning, with regard to the character and quality of sound and the distribution of the latter.

The independent thought, initiative, keen observation, and analytical sense, and freedom from prejudices and routine imposed by extablished forms of musical education.

The theory of musical composition developed by Schillinger (now deceased) is explained in the two volume edition of *The Schillinger System of Musical*

[1] See the article, "Plain Talk on Musical Genius," by Joseph Schillinger, Tomorrow, March, 1942.

Composition.[2] Henry Cowell[3], himself a composer, comments on this system by pointing out that the trouble in the past has been that writers on musical theory have not been scientists, and no scientist has ever tried to make a completed and coordinated system of musical possibilities. But as Mr. Cowell states:

"Joseph Schillinger is the single exception: he was superbly competent in the two fields of musical composition and science. His monumental *System of Musical Composition* represents a lifetime of work in research, coordination and creative discovery."

The unique thing about Schillinger's system is that in it he attempted to apply the principles of mathematical logic, as these are developed by modern thought, to musical composition. In thus applying mathematical logic to the materials of music Schillinger hopes to reveal the unifying principles which will enable the student to grasp the method of analyzing and synthesizing any musical materials he may find or create. Accordingly, in Schillinger's exposition one finds again and again tables of permutations, showing the ways in which musical elements (rhythms, scales, melodies, harmonies, and so forth) may be assembled. Obviously Schillinger believes that a good dose of the physics of sound is helpful in understanding how to produce new combinations out of the manifold of sounds. Thus mathematics, the most recent discoveries of modern physics, and even physiology, all render service in this synthesis of science and art.

As an example of the application of his theory to tonal art, consider the following statement by Schillinger:

"The projection of a melody is a mechanical trajectory. Its kinetic components are balance, impetus, and inertia. Resistance produces impetus, leading either toward *climax*, which is *pt (pitch-time) maximum with respect to the primary axis*, or toward *balance*. This impetus is caused by resistance, which results from rotation. The geometrical projection of rotation is a circle which extends itself in time projection into a cylindrical or spherical

[2] This is a posthumous work prepared by Lyle Dowling and Arnold Shaw, published in 1946, on the third anniversary of Schillinger's death, by Carl Fisher Company. A single-volume account of Schillinger's system is presented in Schillinger's book, The Mathematical Basis of the Arts, 1948

[3] Writing in the New York Times, March 24, 1946.

spiral, or ultimately (through time extension) into wave motion."

As the reader studies this involved passage, he will doubtless think back to the exposition of the abstract beauties of the dynamic, logarithmic spiral. Perhaps he will also recall the strikingly similar analysis of Dr. Paul Schilder, as we summarized his psychological conclusions in the preceding chapter. The reader might well refer back to this investigator, who pointed out that visual motor configurations (gestalt perceptions of movement) are dependent upon principles of constant motion of a whirling (vortex) type, with an associated radiating component. This description duplicates in a surprising degree Schillinger's summary of the projection of a melody. In so far as this is the case, it is an interesting illustration of a transposable form (gestalt) from the visual to the auditory field.

And now, we inquire, what is the significance of these analogies?

The ordinary psychiatrist, studying Schillinger's analysis, might resolve Schillinger's theories into projections of subjective states, further broken down into representations of a "psychic regression" or what may be called "kinaesthetic infantilism." Thus this full-blown theory might be explained as a form of philosophical subjectivism accompanied by psychic atavism or regression.

But if we recall that we have also pointed out that such spatio-temporal patterns of motor imagery illustrate Korzybski's theory of time-binding in terms of the screw spiral form of functioning in the nervous system, we are led to a much deeper view, namely, that the spiral action of time which we find operating in the mind and the nervous system is a kind of internal reverberation of the objective structure of the space-time manifold of nature.

This results in a quite different conception of the nature and function of the arts. They are not an "escape from reality"; nor even merely sublimations of inner compulsions. The "arts of space" -- architecture, sculpture, and the like -- are then not to be treated from the inner point of view as but subjective forms of human experience; and the same must be said for the "arts of time" -- music, dance, and so on. Rather, the mind responds to the language of beauty because mind is itself a manifestation of the organization of the patterns of space and time which constitute the music of human consciousness. If this subjective order of space-time is indeed an epitome of cosmic harmony, then Pythagoras

was right in principle when he proposed a wider objective significance for his number symbolism showing that music is the universal language of nature's architectonic. That is to say, *nature answers to the structure of man's mind, and mind exemplifies the laws of nature, because nature and mind share a common structure, which is the structure of mathematical logic -- more fundamental, even, than the traditional Aristotelian principles of thought and the Euclidian axioms of geometry.*

From this point of view, the relativity of mathematical systems does not destroy the validity of the belief in an absolute language, a *metalanguage;* and the variability and evolution of esthetic standards (e.g., for tonal combinations) does not invalidate the belief in an absolute set of values for esthetics. This "relativity" of truth and beauty to changing human nature may only indicate that we do not yet possess the absolute languages of science and art towards which we are moving. When we get to that final goal -- and this we may never do -- we might find that the language of "truth" and the language of "beauty" are one and the same.

Such, at any rate, is the point of view to which a synthesis of pantheism and humanism is clearly committed. We believe that the fundamental types of motion -- rectilinear, curvilinear, circular, rotational, vibratory, and so on -- are nothing other than the basic elements of permutation out of which cosmic harmonies are woven in time, so that a person like Schillinger is not reverting to infantilism through mental regression, but is in fact in tune with the very pulse-beat of nature when he projects his subjective imagery into his musical creations.

In arguing this view, we shall at the same time try to throw additional light on some other problems that we have already referred to. The subject of "emergence" comes up for review, and in dealing with this topic we shall find ourselves literally in deep water. Water is indeed a remarkable liquid, and we shall have something to say about it as a kind of test case for our theory of *emergent dimensionality,* as it is called. I bespeak the reader's patience while we make a fresh start -- as it may appear -- in order to get the problem before us in full view.

IV. THE DILEMMA OF SCIENCE

One of the most striking features about the development of the sciences is the accelerated accumulation of masses of detailed facts. Along with this has gone an

increasing difficulty in synthesizing these facts into meaningful systems of knowledge. In view of this fact that science does not seem to be making progress toward complete and ultimate explanation, those of us who are interested in synthesis may well ask, what is to be done?

As a possible method of integrating the vast masses of facts of science into meaningful wholes, the adoption of a "phenomenological" viewpoint in science may be advocated. By phenomenology is meant a study of that which *exhibits* itself: it is the *descriptive* point of view obtained by viewing a thing *as a whole*, i.e., a phenomenological presentation is a pattern given in perception, appreciated as a totality.

Much of the trouble of "understanding" the minutiae of science comes from an overemphasis upon microscopic details. It is literally true that we can no longer see the forest for the trees. I therefore suggest that we occasionally ascend in balloons and view the forest and ignore the trees. I suppose the psychiatrist would describe this as a "flight from reality"; but it is interesting to observe that scientists sometimes turn to this viewpoint. For example, physical chemistry, in employing the second law of thermodynamics, is resorting to the phenomenological approach.

Another illustration of the phenomenological method is found in botany. We may view a flower as a phenomenological pattern -- the attitude of appreciation; or like the biochemist, who studies the intimate mechanisms, we may analyze the petals of the flowers into their intricate molecular structures. But we must never forget that the flower, in spite of its detailed complexity, possesses a *phenomenological simplicity* which is responsible for its *beauty* for us. Perhaps this is what J. B. S. Haldane had in mind when he pointed out *(Forum,* Feb. 1927, p. 63), that "To my mind the closest analogy to the evolution of a given group (of animals) is the history of the art and literature of a civilization." This puts biological evolution on the level of artistic production and makes nature the great improviser of aesthetic compositions.

If we thus view the productions of nature as works of art, the pleasant task of the poet and the philosopher (in so far as they limit themselves to contemplation of the *surface* of reality) is that of enjoying the harmonies and melodies of nature's music, leaving to the psychobiologist the study of the basilar membrane processes and cortical functions (or the optic retina and visual cortex, if we shift to seeing); to the acoustical scientist the study of the objective sound waves; and to the

mathematician the discovery of the numerical values of the components of the corresponding Fourier's series.

But can we venture further into the field of science and find these same remarks pertinent? Let us see.

V. WAVE MOTION AND EMERGENCE

As an example of phenomenological emergence, consider the case of a water wave. Even though water as a "fluid" is composed of discrete molecules (hydrogen and oxygen), we apply a mathematics of continuous quantities (the differential equations of hydrodynamics) to the behavior of the medium. The wave we see moving over the surface of the water is composed of H_2O molecules that move in but one direction -- up and down -- *and yet the crest of the wave moves forward in a new dimension, horizontally.* In all analogous cases of emergence, we suppose that each rhythm represents the averaging effect of a statistical ensemble, because the field-forces (in the above case molecular fields) are integrated to produce a macroscopic rhythm. In the mathematical handling of these situations we need what is knows as the Laplace equation.

The most important partial differential equation is

$$\frac{\partial^2\phi}{\partial x^2}+\frac{\partial^2\phi}{\partial y^2}=0, \tag{1}$$

known as the Laplace equation. The applications embrace gravitation, electricity, magnetism, hydrodynamics, conduction of heat, stream lines, isothermal families, conformal mapping.

In three dimensions, the corresponding equation is

$$\frac{\partial^2\phi}{\partial x^2}+\frac{\partial^2\phi}{\partial y^2}+\frac{\partial^2\phi}{\partial z^2}=0. \tag{2}$$

The physicist tells us that the differential equation for the steady flow of heat, light, electric waves, and magnetism, where a is the velocity of transmission, is this:

$$\frac{\partial^2 y}{\partial t^2}-a^2\frac{\partial^2 y}{\partial x^2}=0.$$

This equation expresses the *orderly* displacement in space, progressing along the time-axis. In all such cases, when the properties of a given differential equation are developed, the results are applicable to heat, light, and

so forth, where there is a continuous spreading out of waves from a source.

In our first illustration of the water wave we see how a large number of discrete elements in an averaged state produces a *plenum* -- "water" -- with its wave motions as an example of *emergence*. The reasoning applies to some other instances of wave trains (undulations). As a second example of this averaging process whereby a seeming continuity, a *field-plenum dynamics*, is produced from the statistical behavior of discrete units consider another *elastic medium*, air. *Air* is treated as a *continuum* because it transmits sound waves. And yet we know that further detailed analysis shows that it, too, is composed of particles. In both cases, air and water, no difference can be observed between the superficially observed *(surface)* facts and the behavior predicted on the basis of a mathematics of continuity (the infinitesimal calculus).

In these cases a large number of discontinuous elements in an averaged state produce a seeming plenum, the mathematical description of which requires a dynamics of the continuous (hydrodynamics). Is it possible that the "miraculous" properties of all emergents on all levels arise in the same way in which the novel properties of water arise out of the molecules of oxygen and hydrogen? If so, the historically new dimension of growth and evolution is the *n+1* dimension, where *n* is any lower spatial aspect of "material" (i.e., "particle") elements out of which the higher organization emerges. Moreover, this emergent dimension which is historically new, unlike the motion to which Einsteinian relativity is applicable, is *not* relative -- it is unidirectional or irreversible.

This process whereby particles-in-interaction produce continua, in which wave motions are possible, strikes me as tremendously significant for our discussion. It is our test case for the theory of the emergent dimension, and it is therefore important that we dispose of what may look like an objection to our reasoning.

VI. AN OBJECTION CONSIDERED

Since rhythms and wave motions are taken as examples of phenomenally emergent patterns, some consideration must be given to certain possible objections to our argument. In the first place, it may be argued, there is in reality no such thing as an "acoustical medium." "Air" as a continuous fluid is a fiction. And the same

reasoning which leads to the denial of *air* as the medium for the transmission of sound waves leads to the denial of a hydrodynamical medium *(water)* for the transmission of "water waves." All that exist, says the complete atomist, are the molecules of the various "gases" and "liquids" colliding with each other and making the "pressure," etc. Air, like the ether of space, was created for the purpose of explaining undulations or wave phenomena (e.g., interference effects). But, the complete atomist declares, the "wave" itself is only a mathematical fiction which moves along a kind of geometrical plane, representing the averaging effect of orderly molecular displacements.

And how shall we reply to this argument of the extreme atomist?

For my part, I should agree that a theory of waves based on averaging effects of statistical ensembles is all to the good -- provided we admit that molecular, atomic, and sub-atomic fields of force are active in producing the wave motions. It is these fields of force, associated with the particles, which "iron out" the discontinuities and produce the plenum. Such wave patterns are therefore true examples of *gestalten,* or phenomenal patterns which exhibit elements of novelty, and must accordingly be treated as genuine examples of emergence.

What would be the reaction of the complete atomist to such an interpretation?

If atomism means materialism, then no doubt the complete atomist would have none of this "mysticism" of emergence. Here, in developing this view, I have recourse to the argument of one of my former students, Mr. Eugene F. Coleman, who states: "To show how scientific formulation invalidates emergent effects, let us consider the case of a stretched cord, upon which a traveling wave can be set up by plucking it. The essence of the physical mechanism of such a wave is precisely equivalent to the case of waves on the surface of water; but I have selected the string example because the physical interpretation of the formulation is more clear-cut. In a string vibrating with small amplitude, the individual particles of the string have motion only in one direction: that perpendicular to the length of the string and in the plane in which the string is plucked. However, simple scientific reasoning based on the 'laws of motion' enables us to derive an expression giving the precise distance, y, which any particle of the string is from its normal position, at any time, t, after

any convenient zero reference. This expression has the form,

$$y = p \cos (At - r),$$

where A is a constant, and p and r are simple stated functions of the distance, x, of the particle in question from one end of the string. Then, after the expressions for p and r in terms of x are introduced, we have a functional relation among x, y and t. This functional relation organizes the string in a unique way: we would say that a progressive wave passes along it. The wave is something new, a higher aggregate of organization, emerging from the more homogeneous background of the string-particle displacement. In some sort of vague way this wave may be supposed to have an element of complete novelty about it; but the novelty is, in principle, no greater than that involved when a particle is subject to two independent velocities in different directions and pursues a velocity in a new direction. In fact, the appearance of the wave is, technically, built up out of just such purely simple combination effects as this. Any element of novelty which is present is supplied by the imagination. Perhaps the full significance of this will be made clearer by considering that the wave is *completely predictable* in every detail by purely analytical methods -- methods of the sort used in building up large-scale phenomena from the properties of small-scale things. In this sense there is no element of novelty, so that the case of 'waves' on the surface of the water (which is completely analogous to the illustration here used) does not prove that there is a 'creative' element in the 'emergence' of the pattern."

This is an excellent statement. Nevertheless, there is a subtle point which is overlooked in this reasoning, and that resides in the problem of how to get a continuous process out of the behavior of an aggregate of discrete units. And that is what is meant by "emergence" in this case. Here we see inferior random forces yielding their freedom of motion to a higher order of simplicity. This conception of the emergent dimension as the historically new space created or deposited by the forward motion of time has the merit that it satisfies the two requirements of a theory of progress, individual and social, which are (1) *freedom,* and (2) *self-discipline.* For example, in the spiral action of time there is movement into a new world of dimension *(freedom),* but this is not haphazard, but controlled *(disciplined)* by conformity with the best from the past, which makes

time-binding possible. In other words, the time-line would not be a spiral if there were no continuity with its own past -- it would be a different kind of a line.

It will be observed that in the preceding paragraph we have already generalized the application of *spherical harmonics* to include psychological and social phenomena. In all cases we are concerned with tracing the manner in which functions are spread over spherical (advancing) surfaces. In special cases, the results will look like the globe's lines of latitude and longitude, that is, symmetrical patterns. But, like Mr. Kunz, we suppose that this method not only has wide applications in electricity, and the rest, but also has possibilities of application in the treatment of the electromagnetic forces at work in biological and psychological domains.

VII. ISOMORPHISM AND DIMENSIONALITY

Our concept of an historically new or emergent dimension was deliberately framed to provide a reconciliation of the *relativity* of motion with the absolutivity of motion. This is the manner in which the synthesis is attained.

The type of motion in which mechanics is primarily interested, let us grant, is subject to the principles of Einstein's relativity theory (though it must not be overlooked that the case for rotational motion is still controversial). But *growth,* a type of change, and therefore motion, in which physics has not been interested, is *not* relative. It is a form of motion (change toward increasing complexity of parts and interdependence of function) to which Einstein's relativity -- special or general -- does not apply.

Motion as it is represented by the fourth coordinate of the space-time continuum is relative; but evolution, we observe, calls for a new dimension of time, a new form of temporal organization of the previously existing parts (particles). This historically new dimension of growth (a fifth dimension for plants and animals, if we follow Kunz) is for us the $n+1$ dimension, where n is any lower spatial dimension of "materiality" out of which the higher temporal organization is to emerge.

Whenever we can refer to a system as a whole, with its own spatial coordinates and its own "local" time, this time is transposable across the parts, as Professor R. H. Wheeler has pointed out. If now this system (K_1) enters into dynamical interaction with another system (K_2), the two together may form a new system (K_3), and

this system, so long as it is regarded as a whole, will also have its phenomenal (emergent) time transposable across the whole. *This new, public time is what we mean by the emergent dimension.* The "social" order which brings a "public" time out of the "local" times of the individual constituents may even have its own "emergent mass", as George H. Mead stated, and this, for us, represents the non-linear sum (a field polarity) of the family of subordinate systems. Thus a "macroscopic rhythm" is an integration of the constituent "microscopic rhythms." Accordingly, in our view, emergence adds a new "degree of reality" to any lower plane of being.

It will now be clear to the reader that the term *dimension* in its most general sense is no longer limited to what we call "space." A "dimension" refers to any *manifold* which can be *ordered.* The particular way in which the elements of any dimensional aggregate are arranged is known as *serial order.* Serial order covers such relationships as succession in time (therefore time is a dimension), positions in space, the series of natural numbers (1, 2, 3, etc.), a temperature gradient, and many other important relationships which exemplify what mathematical logic designates as transitive, asymmetrical relations.

In this view the distinction between "space" and "time" is to some extent relative -- like the distinction between the "static" and the "dynamic" aspects of nature -- for what appears as a space-interval from one point of view is a time-interval from another -- except that from a point of view higher than the "physical" in the series of levels of evolution the time-series is absolute, being irreversible or unidirectional. This idea is in harmony with the theory of Dr. S. Alexander, who shows in his treatise on *Space, Time and Deity* that the ordering of points of space (serial order) is due to the "betweenness" of instants of time.

It is this property of emergent evolution of turning time (function) into space (structure), by congealing the products of evolution into the "matter" of the next higher level, which has created the advance of nature from *atoms* $\longrightarrow$ *molecules* $\longrightarrow$ *living cells* $\longrightarrow$ *multicellular organisms* $\longrightarrow$ *humanity.* The significance of this fact for the creation of the coming psychosomatic organism which is the world brain has already been pointed out in previous works.

In this manner we make good our earlier promise to find a language which can be put on an all-world basis for invariant transfer across social wholes. It is a curious fact that mathematical symbolism and musical

scoring are the only international "languages" that Western civilization has thus far developed (Basic English being very restricted), *and this suggests that perhaps music and mathematics promise better than any other media to satisfy the requirements of a universal language.* This is particularly important if the object of scientific investigation -- the *Cosmos* -- and the field of aesthetic and emotional perception -- *Music* -- both turn out to be applications of the more fundamental science of mathematical logic (as indeed Schillinger proposed), the study of abstract and universal order systems. In the preceding study of such order systems we have made reference to the equations of spherical harmonics, *where we find isomorphic structures exemplified in such widely diverse fields as the flow of heat, light, electricity, magnetism, stream lines, conformal mapping, and the rest.* Thus the subject which in the days of the ancient Greeks was incarnated in what Pythagoras called the "music of the spheres" now comes into its own, and the full circle of growth is complete!

The world that is coming toward us is one that should provide a maximum freedom from special linguistic frameworks. Mental shackles are forged by verbal habits, and conversely; and a higher mental-verbal world will come into being with a broadening language-logic emancipation. *Already in music and mathematics we have two languages -- emotional and intellectual -- which, between them, may provide the basis for further developments in human communication and understanding.* In this manner, and at long last, we come upon the forerunners of an invariant symbolism, free from the elementalistic frames of reference of races, religions, and nations.

VIII. THE PLANETARY LOGOS?

These considerations bring us back to the problem: Do we need to posit the existence of a Great Interpreter, filtering down into human consciousness from a higher dimension (as Kunz would suppose) to explain the intertranslatability of man's cultural symbolisms?

Without dismissing this theory of the All Knower (to use Royce's term), we call attention to the fact that the conception of an Archetypal, Antecedent Being is absolutely required, if our theory of emergent evolution is correct. For every new emergent level that evolves out of the aggregate of constitutents of the old level has a similarity of structure (isomorphism) in which the properties

better analogomorphism

of the higher level can be put into correspondence with the properties of the earlier level.

On the human level this means that out of the psycho-biological substratum of human nature (man's innate biological equipment) a social order is evolved, and when men, as constituent unities of the higher-coming-world-organism, exhibit the transposable (gestalt) traits of the social organism -- such as extra-sensory perception and the universal symbolisms and values of the arts of space and time -- this may mean, that a great antecedent reality, the All Knower or God, is speaking through the evolving consciousness of individual man, and that men are creating within themselves a great, collective Image, *God,* the highest emergent reality of all time!

But before we arrive at a final decision on this matter, it is necessary to come to terms with Mr. Kunz's conception. It may be that there is some further possibility that has hitherto eluded us; but to discover that we must first orient ourselves again with respect to Kunz's cosmological formulations.

IX. FURTHER REFLECTIONS ON THE HARMONIC COSMOLOGY

We begin by recalling Mr. Kunz's proposal that we may derive time-properties from growth as time properties come from motion as studied in physics. This is an ingenious proposition. When, for example, Mr. Kunz supposes that the only way to understand specialization after the first few stages of embryological development is by ascribing time-lag to cells, which time-functionings are as exact as volume developments, we have a fertile insight. The effect of this line of thought is to encourage a confidence in the validity of the theory of emergent evolution as an operative truth, whatever may be its role in a final metaphysics.

To discover that role we must go very deep. This leads to other philosophical problems, and the answer must be given in very general terms. For example, as Kunz points out, the Relativists set up more tensors than they need, and then reduce the number to coincide with the actual. This means, I suppose, that the world of possibilities is much richer in ideal content than the actual world, so that, as Leibniz and Russell would say, *the actual is a privileged position of the possible.* Now if, as Aristotle would say, change is the passage from potentiality to actuality, it may well be that Kunz's philosophy will in the long run survive all criticism and prove its adequacy. But it is precisely

here -- that is, Aristotelian *potentiality* versus non-Aristotelian *emergence* -- that we come to the crux of the whole matter, and perhaps the parting of the ways.

In our own philosophy we have relentlessly pursued the consequences of the idea that the next level of human evolution will see the real -- not illusory -- emergence of a true social organism. But thus far I have not brought off to my own satisfaction the methods and mechanisms whereby cephalization of the psychosomatic organism is to be achieved. Even now, after years of pondering, I do not see the final solution. None the less, it is possible to look into the *direction* from which the solution will come.

The solution to the problem must be sought in the development of the theory of the space-time matrix, on the lower level, as the field for embryogenesis on the higher level, and not the reverse, as Kunz postulates. That is, we suppose that the idea of the electromagnetic field of force, already familiar in physics and now being studied in biology as individuation fields, will help in relating emergence to space-time geometry -- perhaps, as we have guessed, through the idea of a social "neurotropism" bringing human beings as the units (neuroblasts) of the world-organism into the new synthesis of a "world brain."

It may ultimately turn out that this will bring us to something close to Kunz's conception. But the theory of emergence must not surrender any of the territory it has already won. For example, in our *World Sensorium* we have already pointed out the very significant fact that man's progress socially is commensurate with his means and media of locomotion. This progress is real, and must not be explained away be hyperspace absorptions. We see now, in retrospect, that in successive order man has conquered solids, liquids, and gases. From the land (solids), sea (liquids), and air (gases), man is in a position to move on to a still more subtle medium. The next medium for man's self-evolution beyond the solid, liquid, and gas states of matter lies in a fourth domain -- *that of field-physics* -- which provides the coming challenge to man's capacities.

It is true that in recent years the "ether of space" has fallen into disrepute. But the *field* is now the substitute for the older *ether*. Whatever its name, the field medium is real, and in our topology of humanity we find evidence for an energy continuum mediating the "atoms" of the social organism. This energy-field for higher synthesis is no mere shadow of matter in motion, but the driving force behind an imminent biosocial development.

Man had his first dramatic introduction to this ethereal medium in the energy of nuclear fission, as revealed to the world in the baptism of atomic energy at Hiroshima. Nuclear energy is energy in its basic form, the very energy of creation itself. Now we must move into the new dimension of reality opened up by atomic fission; we must socialize the energy released into our world by the energy of creation; and we must use the medium of field physics for the development of higher (coming) forms of existence which are even now beginning to manifest themselves in a flickering and fitful manner, as we shall see in the next chapter.

CHAPTER IX

HUMANISM'S GREAT EXPERIMENT

"Sing to my soul, renew its languishing faith and hope
Rouse up my slow belief, give me some vision of the future,
Give me for once its prophecy and joy."
-- Walt Whitman

"Great God, I ask thee for no more pelf
Than that I may not disappoint myself,
That in my action I may soar as high,
As I can now discern with this clear eye."
-- Henry David Thoreau

I. WHAT IS MAN?

Over a period of two decades the writer has set forth the claims of a philosophy known as "scientific humanism" as the most promising guide out of our present world chaos and confusion.

The term "scientific" indicates that the methods of the sciences will be the guide in the development of this relatively new philosophy. Science by its very nature knows no regional boundaries, and in its operations is fundamentally democratic in character. With publicly verifiable truth -- the same for all men -- as its goal, science cuts across all divisive influences. Thus a

"scientific humanism" seeks a philosophy which would in principle be understandable and acceptable to the enlightened peoples of the world, no matter how different their recent political histories may have been.

The "humanism" part of this theory stresses the fact that in seeking for a world philosophy, a start must be made with the study of man himself as the most complicated thing in the universe, in the belief that *when we understand man himself, the essential man behind all the fragmenting forces of regional languages, religions, and local cultures, we shall be on the way to a planetary philosophy without which no world government and lasting peace are possible.*

Of course the key problem for this philosophy is this: *what is the "essential man" behind the diverse psychological types and cultural deviations of mankind?* The answer, briefly, is this: *the power of man to continually recreate himself and his environment, the power of self-evolution through the application of human intelligence, is what makes man human.* "Creative imagination" -- the image of god in man -- describes this characteristic human trait.

From this it follows that the easiest way to make man feel "inhuman" is to thwart his creative impulses. Social institutions and patterns of ideas which do not foster man's powers of growth and self-evolution will necessarily stifle and frustrate his creative imagination. The greatest "subversive" force in society is this "stop man" movement whereby tradition, authority, and vested interests seek to control future generations of mankind.

Today there is a tremendous conspiracy against mankind. This is largely an unconscious plot, born out of fear of what the future holds in store for us. In times of crisis and uncertainty, men frequently cling to the past, lacking the courage and imagination to plunge forward into an unknown future.

II. IMAGINATION AND MEANING

Certainly it is clear today that the great masses of mankind suffer from a lack of imaginative interpretation of the human scene. Millions of people everywhere are reading and hearing dozens of rapid summary and survey programs -- on the radio, in the newspapers, in study groups, on platforms, at the movies, everywhere. But the net result does not add up to anything significant. The pattern of meaning is still missing.

Instead of possessing vision and hope, we languish in the mental doldrums, or squirm with apprehensions born of fear: fear of the breakdown of the world's financial machinery, fear of another war, fear of communism, and all the other fears that men have fallen heir to. When someone comes along telling us prophetically that if we could dissolve the psychological barriers our problems of production and distribution, and international peace, would vanish, the business men, the politicians, the bankers, the preachers and teachers no less than the economists -- all with their solidified mental patterns -- inform us that such "dreamers" are "crackpots" and know nothing about economics, politics, and the like.

If we think about this problem in terms of Jungian psychology, our problem appears to be this: how to create a new archetype for humanity -- a new collective image to release man's pent up creative powers? If, as Northrop Frye puts it, "imagination is energy incorporated into form," our problem becomes that of creating a good "lens" for humanity to focus its formative energies. Such a collective image would give us what I shall call a social vision of a territory-to-be.

When we get that collective vision, we shall have our psychological revolution: the birth of a consciousness of universal relations which, like public time, are transposable across the social whole which is Humanity in its collective unity.

III. ENERGY-BURSTS AND CREATIVITY

The problem is to develop a technique for building up a tremendous potential and then guiding and releasing the great energy-bursting to create a new World Forum. Surely the endless stirrings of today are symptomatic of the accumulation of prodigious emotional reserves of mankind. These stirrings, moving on to some coming climax, are forerunners either of a sadistic destruction of all forms, or the prelude to the coming into being of some giant form of the future. Which it is to be man must decide. We are getting to the place where it is either mass creativity or mass destruction.

Our theme, then, is set by the spiral urge toward a World Form. According to the theory of scientific humanism, the darkening clouds of social disaster hovering over the mass fields of the human scene cannot be dispelled until we synthesize a world view in which religion, science, art, and philosophy are coordinated with economic-political institutions to give human life

an inspiring purpose and direction. This cultural unification must create a pattern of meaning out of the mosaic of history. It must provide a time-binding synthesis. The morale of enlightenment -- Humanism and Pantheism together -- always seeks the threads of historical continuity: for example, it recalls that twenty-five hundred years ago Muti said, "Let one love another as one's self; let a nation love another as its own." This ethics, enunciated in the religion and philosophy of the ancient East, was restated later in the ethics of Jesus, wherein the divinity in man is transformed into the symbol, *The Father,* and this, as the English critic Fausset realized, means "all the potentialities of the past." This need for continuity with the best of the past must not be forgotten: it is what we must build upon.

Today the masses of humanity no longer have any holding ground in the form of living memory. The "Christian" nations still hold on the Christmas and Easter; but eventually -- in the absence of a great vision -- there will come a tidal downsweep, after which no one will listen to anyone and the destruction wrought in the last war will look like toy stuff.

This downsweep is a real possibility. But we must not permit the weary "realists" and the disillusioned cynics to discourage us. These are not days for the trumpeting of doom. Our psychological revolution is for a living world, not a dying one. If the passing pageant of humanity moves with seared hearts and crushed minds, there must be other hearts, other minds, other lives, another vision.

And here the new collective image *(mythos)* comes into focus. While the motive of pantheistic humanism is social in origin, its background is cosmic. The goal is to pull all topwing minds into the vision of the sweeping splendor of planetary planning. What we suffer from is not the aftermath of incessant warfare. We suffer from a disintegration of culture arising from the fact that men have been made sick by too much revolving around egocentric and ethnocentric axes. Today the only axis worthy of its pivots is a planetary axis -- a global axis centered on a planetary humanism.

What the world requires is a great awakening of the manipulative genius of mankind. Creative vision must dissolve mental fossils, free mankind, emancipate the world from the prison of self-enslavement. Our theme, therefore, is set by the spiral urge toward a world purview, and the spread of the vision must curve over all behavior of the human drama.

IV. VISION AND MEMORY BUILD-UP

The central difficulty with humanism has been that it has tried to put a simple message into *words,* whereas such a message can only be written into the form of a universal picture language. The job is to find a layout, a picture basis, so simple and so huge that it is seeable by anyone who has mastered the movies or can punch a radio panel. If it were possible to use the full play of international techniques, an all-world drama could lift the inner lives of peoples to their own transfiguration by sheer evocation of power from within.

We must learn how to shrink our knowledge so that it can be put on a universal history basis, for invariant transfer across social wholes. This topology of humanity, as I have called it, would appear as a language of motion -- a psycho-social motion or spiritual traveling. Just as the physicist interprets physical events in terms of field structures curving the space-time manifold, so scientific humanism would curve a psycho-social matrix over biological evolution and bend the arc of human history into a time-spanning synthesis. We must cross-web the cultures of the peoples of the earth into the fabric of a higher consciousness. If we could get the form of this great vision into our consciousness, there would be a tremendous uprush to the humanism idea, a group upsurge to social creativity. Thus a scientific humanism would incarnate the space-time drama of epic proportions which expresses the social analogue of the physicist's *space-time* continuum. Riding along on the great impulse-tensors of a guiding field, man then reveals himself in the setting of world embryology as the head-end or advance wave of evolution, precipitating a skeletal structure of a new mode of being. In that time, the energy of humanism will stream happily on its way, secure in the knowledge of the big idea behind it all.

What is required in order to attain the new World Form? What is this energy-burst that can sweep over walls and tunnel through barriers to give history a new perspective? How shall we muster the authority to mount wave on wave of great striking acts in meaningful sequence?

What would happen if all the members of the human race were to think the same thought, do the same act, at the same time, around the world's great circles? It would be as if, at some agreed upon time, a kind of planetary hour of sunrise for mankind, all men on this terrestrial globe were to turn to a universal Mecca, hearken to the prayerful message of a sort of "Polar

Muezzin" at the roof of the world. This would be a universal invocation -- for the first time in history. As in the stories of fireflies flashing in unison, there would at least be a synchronization of the thought and the deeds of men the world over, a synthesis of spirit centered in some universal objective.

This vast experiment would, temporarily at least, involve the cessation of all other activities. But what sort of creative or destructive act would this be? With many activities suspended, what would emerge? Or would human life terminate? And if the experiment is technically feasible, what objective could evoke such a unity of head and heart in one universal benediction?

As a matter of fact, the human race is already building up to a situation in which some sort of "global experiment" will be undertaken. When the climax comes, each person will concentrate on a common objective. At the moment the objective would appear to be the necessity for exterminating the "enemy." Two conflicting ideologies and ways of life seem to make World War III well nigh inescapable.

But in the experiment I am proposing, there are not two sides, each of which is determined to destroy the other. The common goal is the same for all. Possibly, then, if our experiment had no other result, it would create a condition in which thoughts of mutual annihilation would be put aside. But we might anticipate another, and more sublime, result: the creation of an earth-organism, with a world brain, for a planetary way of life which would bring all history into focus in one tremendous burst of creativity. This would free us from man's inhumanity to man. Thus transmuting the planet into a single world organism, the anguish of the human species would be sublimated into an intense delight in seeing the completed meaning of the long struggle of evolution through the eons.

V. A GLOBAL STONEHENGE

Doubtless my readers are familiar with the story of Paul's speech on Mars Hill -- to the ancient Athenians -- where St. Paul interpreted to these pagans, in Christian theology, the meaning of their statue erected to the "Unknown God." But long before these early beginnings of the Christian era, Stonehenge stood as a circular symbol of a still earlier form of cosmic worship. The philosophic humanist, meditating on these evidences of man's deep impulses of awe and reverence,

wonders whether a renascence of worship might not find its modernized expression in a globalized Stonehenge of a literally *As-Yet-Unknown God,* in very truth embodying God's plan for man because it is mankind's plan for the god-like in humanity. In brief, what we are suggesting is that for pantheism the "Unknown God" yet to be "revealed" to man is personalized in man's endless capacity for conscious self-evolution through social creativity.

Is it not Emerson who somewhere quotes an antiquarian as saying that Stonehenge is God's scheme for the world? This reminds one of Sheldon Cheney's statement that the coming feature of housing will be the reduction of opaque, fixed wall sections, so that -- to extrapolate this -- the entire world becomes our movie screen, so to speak, and we sit in our glass houses by the side of the road friendly to man. The Stonehenge walls then expand, and all the world becomes a stage, with the sweepaway sliding off into the huge circle of man's horizon expanding to planetary proportions!

If we could exorcise old habits of thought and free man's imagination, we could emancipate the world from the ball-and-chain dream sequence -- the social nightmare we call "reality." A great visual drama, a play on an immense scale, might lift us up and stir our perceptions, so that we would feel ourselves actors on a stage as big as the world itself. We envisage an inauguration ceremony for World Government, marking the symbolic beginning of the reign of universal humanism. Through man, God would walk the earth and commune with living things. Every movie house and every home equipped with television would become part of a great cathedral, each cathedral center and each spectator a participant in a great communion service.

Taking light as the oldest symbol of ethical-spiritual aspiration, we would use the movie cathedrals as community centers: each a Plato's cave of shadow-play, working through an alchemy of light and color, shapes and sounds, to produce the space-time drama of our planet as the analogue of Minkowski's four dimensional continuum. We would portray the whole cyclodrama of man's history up to the moment of the big experiment. Using millions of television sets in homes, and a great central clocking broadcast to act as a universal drum for movie cathedrals and homes alike, we would build up a tremendous stirring through all Europe, all Africa, all Asia, and the Americas. This gathering of the demonic energy of humanity through the all-world drama would precede the greatest cultural, financial, industrial activity of all time.

This cyclonic visual drama, a play on an immense scale, might lift us up, cast a spell over us, and picture for us our roles on the earth's revolving stage. A choreography of meaningful movement, a chiaroscuor of significant pantomime -- that is the technique. But what is the purpose? What could one hope to accomplish through such a frenetic experiment?

VI. MAN: AVATAR OR ATAVIST?

The object of this planetary experiment is to raise humanity to a new level of consciousness and bring about the synthesis of the introvert-extrovert, East-West, types of mankind discussed in the previous chapters.

Perhaps some of my readers have read the article in *Life* (March 3, 1947) on "Psychosurgery" -- a report on the operation which involves severing the *prefrontal lobe* (supposed to be the seat of the "superego") from the *thalamus* (supposedly the seat of emotion, the "Id" of the Freudians) in order to relieve insane patients of the emotional tensions which produce psychoneurotic perversions. As the reader will recall from our *Table of Orientations,* my own theory of cortico-thalamic synthesis is based on the idea that Level III (the non-Aristotelian level of a coming world culture) will reinstate *on a higher level* something similar to Levy-Bruhl's "mystical participation" of primitive peoples. *Psychosurgery* seems to me to be a device for transporting a person mentally from the second level to the level of primitives, thus freeing a person from the abstractions of cortical symbolism which he is unable to handle in a socially acceptable manner.

The criticism to be made of this (psychosurgery) type of "solution" is that it involves a form of *atavism,* and is not using conflict and tension as a creative force: it virtually renounces the possibility of a creative self-evolution. What we need are *avatars of synthesis* -- supermen -- not *atavists of evolution* -- subhumans. Instead of reverting to the earlier level by disconnecting the higher level of the neencephalon from the old brain, why not evoke a new structure to be added as the basis for a still higher level of integration to produce what we call the "head-and-heart synthesis"? That, thoughtful reader, is the objective of the great planetary experiment.

The essence of the theory first proposed in a tentative manner (in 1937) was based on (1) *using atomic energy (radiations) to initiate the genic (or chromosome)*

changes which cause mutations; and (2) *doing this under the guidance of a psycho-social field to control the course of the biological changes so that the form of emergence is determined.*

This means, if my theory is correct, that the psychosocially visualized form of the new humanity would act as a morphogenetic field or matrix, and man's idealized image of man would function as an archetype to create or give form to the New Humanity. This, if achieved, would be one true instance of the "inheritance of acquired characteristics" (here Russian science would be right), because man literally thinks a new structure into existence. If such a remarkable result were forthcoming, the creation of a world brain and a world heart would bring all history to a sublime climax. These social organs for a planetary way of life would transform the earth into one psychosomatic organism.

What, you ask again, is the purpose of this planetary experiment? We reply: the purpose is the proliferation of a hitherto unknown function of the mind, different from the logical function, which would establish the type of one-ness we have repeatedly described as a cortico-thalamic synthesis -- but on a new level of integration. This would be Level III of our *Table of Orientations.* We have long urged that the understanding of the universe is something more than intellectual analysis: it involves also the sort of "feeling with" which Bergson terms "intuition," except that we call it *insight* and do not set it in opposition to intellect but regard it as intellect raised to the higher level of scientific mysticism.

VII. THE ROLE OF PLANETARY POLARITY

Let us suppose that all human beings were to turn toward the north and try to visualize some sort of stream lines -- *mental isotherms,* as it were -- giving our thoughts wings, as if they were birds flying towards the earth's magnetic pole. If this concentration of energy on a collective image were synchronized by a central clock through signals sent out by radio, could we thus produce a new (emergent) time-axis, with transposable properties (values and ideology) across the social whole? Would the macroscopic field thus produced exert an influence on the chromosomes to create within the individuals on organic hook-up *(resonance?)* and give birth to the head-and-heart synthesis? If such a biosocial experiment were possible, how would the individuals participate as parts (cells) within the emerging super-organism

which is Planetary Being? And would the culmination of the mutation yield the sort of illumination which R. M. Bucke described as "cosmic consciousness"?

If we answer these questions in the affirmative, this means that on the social level we are seemingly subscribing to a form of Lamarckian doctrine of the inheritance of acquired characteristics. Man would apparently develop the organs of superman because he wanted to be something more than what man is today. But before classifying ourselves in this manner, let us get all the possibilities before us.

VIII. DARWINIAN VERSUS LAMARCKIAN EVOLUTION

In the main, there have been two types of evolutionary theory available, as follows:

A) *Evolution by Lamarckian Factors:* the influence of desires or needs and the inherited effects of use and disuse.

B) *Evolution by Darwinian Factors:* heredity, variation, struggle for existence, and survival of the fittest.

The argument between the present followers of Darwin (the neo-Darwinians) and the followers of Lamarck (the neo-Lamarckians) is something more than an academic issue. Not only the question of the method of past evolution, but the problem of the future improvement of the human stock, hinges on the outcome. The hereditarians (neo-Darwinians) deny that the strivings of individual men have an influence on the genetic determiners which are responsible for structures and traits; whereas the environmentalists (neo-Lamarckians) believe that modifications due to individual efforts to use and improve the structures of the body will produce changes that will be structuralized in the organs of new generations of animals.

Our own theory of self-evolution through conscious striving would seem to favor the Lamarckian theory, except that in the past I have never asserted that such efforts would have any direct biological influences. Even now, when I suggest an experiment in mental control of biological mutation, I might, if I wished, escape the implication of the inheritance of individually acquired traits. I have in mind here the third possible theory, which was explained in *The Promise of Scientific Humanism* (1940, page 201), under the term, the "hypothesis of parallel induction." This idea, neither pure Darwinism nor Lamarckian theory, admits the possibility of the

appearance in subsequent generations of structural modifications that *apparently* are the result of function and experience in the organism (the effect of desire and use in Lamarck's terminology), but *in fact* are the result of changes that occurred simultaneously in the somatic and germ cells without there being any causal interaction between bodily behavior and genetic units.

Actually, however, as previously indicated, I am willing to overlook the objection to the Lamarckian theory on the human level. It may be that the inheritance of acquired characteristics is a fact on the human level, while not a fact on the levels of subhuman evolution (the Soviet-Lysenko argument to the contrary notwithstanding), because men can have clear mental pictures of what they desire, while imagery in animals (whether motor or visual) is virtually non-existent.

In taking up this problem of producing the "new humanity" we are not suddenly cultivating an interest in a subject which previously was not in the focus of our attention. This problem, for me, is an old theme, and the present views are merely an extension of ideas previously advanced. But before taking up these recent developments, it is well to recapitulate our journey up to this point. Roughly, therefore, I am following the temporal order in which these thoughts emerged in my own mind. The topic is so complex, that this seems the best way to give coherence to ideas which are gradually being worked out.

IX. RADIO-MUTATIONS AND MAN

In an article on "Cosmecology: A Theory of Evolution" (*Journal of Heredity*, November, 1937), I proposed a theory of radio-mutations based on the ability of rays of short wave length (gamma rays, cosmic rays) to produce changes in the genes and thus cause biological mutations. It was there suggested that cosmic ray showers have a periodicity and that as the ion blanket above the earth raises and lowers (for reasons having to do with the sun as the pace-maker of biological evolution here on the earth), the creatures on the earth are irradiated. It was there stated:

"Indeed, the recent work of Carl D. Anderson and Seth H. Neddermeyer on top of Pike's Peak indicates that cosmic rays are capable of smashing up atoms and molecules and liberating highly penetrating neutrons. When, then, shouldn't cosmic rays, or better still the secondary

radiations in the form of high-energy particles released by cosmic rays, be able to reach the genes and bring about nuclear changes in the organisms no less effectively than in the hearts of atoms?"

A further implication of this theory was pointed out in the last paragraph of the above journal article, as follows:

"One interesting implication of the present theory is that evolution is not yet done with the human organism. If it is true that biologically and mentally man is still in process, and new traits yet remain to appear, one may well wonder what the future superman will be like. Interestingly enough, our own hypothesis throws some light upon the possible time of advent of a new species of humanity. Our yard-stick for measuring the tempo of evolutionary advance suggests that humanity is still in its infancy and that we will have to wait a long time before the 'manhood of humanity' is reached. Apparently man must remain content for a long time to come before any radically new changes take place -- unless, through radio-eugenics, we take the fate of biological evolution into our own hands, and in that case we may find it feasible to create or remake human nature to suit the requirements of our social architects. If this view is correct, the induction of mutations, and their selective utilization may offer our one true hope for a genuinely creative control of conscious evolution."

But how can evolution be artificially speeded up, so that man will be kept ahead in the evolutionary parade? In the further elaboration of this article in the corresponding chapter of *The Promise of Scientific Humanism* (1940, Chapter 21) these lines were added to the reproduction of the journal article:

"But how can evolution be speeded up? Since at the present time man does not know how to control the ionosphere and elevate and depress it to suit his will, the increase in the number of cosmic ray collisions with the genetic units to produce the radical mutations necessary to the creation of a race of supermen can come only through rearing a race of humans on the highest mountain tops where the cosmic rays and showers are relatively numerous and plentiful. Of course it is possible that man will eventually learn how to produce in his scientific laboratories the wonders of heaven, and in that case his cosmic rays can be 'made to order.' Man's

strategy has always been to 'learn from nature' -- and then go nature one better."

Now, today, since the mastery of the science of nuclear fission and fusion, man *does* know how to release and utilize the neutrons referred to in our 1937 article. So that instead of going to mountain tops to create the "new humanity," we could, if we wished, subject human foetuses to irradiation by the byproducts of atomic fission and fusion. But we know that the byproducts of atomic disintegration can be very harmful. The study of the biological effects of the atomic explosions in Japan indicates that the radioactivity thus produced can cause sterilization and death in those exposed, and possible malformations in subsequent generations of those born of the generation that lived through the baptism of fire to reproduce themselves.

But we also know, on the other hand, that nature has always in the past exacted a high price for biological "progress" -- which means that for every mutation that is beneficial many more mutations are harmful, and it is possible that the same ratio would be maintained on the human level. But we underline the *possible*. Perhaps the beneficial use of atomic energy (outside its uses in medicine) is a matter of selecting the right types and dosages (frequency and duration) of irradiation, *plus the controlling influence of a mental guiding field.* This latter would be a kind of *psychokinetic effect* on the level of biological causation.

This is the point our speculations had attained, until we decided to take the next step. The next extension employs the idea that the changes in the spiral arrangements in the cells (the protein chains of the chromosomes), which are responsible for evolutionary changes, are related to field conditions, possibly even to the electromagnetic lines of force of our rotating earth. In that case there would be some sort of synchronism between the macro-universe and the micro-universe, so that each helps to determine the other. Accordingly, while the earth has created man (speaking loosely), man will in turn play upon planetary field conditions and influence the course of evolution, because the cell-field and the earth-field are in resonance or rapport.

Much of the theory, even in its most recent form, is still vague. But one of the persistent ideas is the supposition that, with the passage of time, *mind,* or conscious field energy, will assume an increasing influence over matter, and that the requirements of the macro-universe will coerce the elements responsible for

mutation through a psycho- or field-kinetic effect. That is to say, if and when the earth's environment is filled with radioactive rays, the human race could concentrate on some collective image (archetype), the field of force thus organized on a macroscopic level might then reach down into the organizing field of the hereditary determiners to fabricate the counterpart of the social image.

The reader will have noticed that part of the argument involves an appeal to Dr. J. B. Rhine's controversial *PK* (psychokinetic) effect: if mental concentration can somehow influence the statistical distribution of the faces of the dice, why can't mental-social concentration (a vast cultural experiment) influence the distribution of the hereditary units to bring into being the appropriate organ for achieving what we have imagined socially as the characteristic of the man-to-be?

At this point it became clear that a fantastic theory had been crystallized. Therefore, to maintain some semblance of contact with reality, I submitted this theory to several scientists to get their comments. First I sounded out Dr. Rhine, and he replied (in part) as follows:

"I hardly know what to make of your treatment .... I *am* increasingly impressed as to the necessity of recognizing the mind as a determining factor in evolution. Our PK experiments have given more foundation to this hypothesis than any other one item, but there is considerable support from psychosomatic medicine. I wonder that you do not draw upon this material.

"We are doing some experiments here to extend the PK work into the biological world, but we are not far enough along yet for conclusions and are saying nothing about them. PK is, of course, an obvious instrument of Lamarckian inheritance."

It was to be expected that Dr. Rhine would have some interest in this line of theorizing. At the same time (May, 1947), I submitted these same ideas to Dr. C. J. Herrick, eminent neurologist, for his comments. Here is the exact language in which the problem was stated:

"Here is where you can help me: Suppose you were given the power of a creator and decided to confer upon man a new biological structure which will make it possible for man to escape the inner conflict, with reason pulling one way and emotions and instincts going the other way -- what kind of organ for a new level of

synthesis would you endow man with? Where inside (or outside) the cerebro-spinal axis would you locate such an organ? If you had to, could you, as creator, find a way to transcend man's dilemma: revert to primitivism (prefrontal lobotomy) or crucify yourself on a cross of conflict because you don't have enough intelligence to recreate civilization so that man won't frustrate his own happiness and destroy mankind?"

In his reply, Dr. Herrick wrote as follows:

"Your letter reminds me of the Dutch proverb, 'The sail (of theory) is too big for the ship (of fact).' While your theory cannot be ruled out as possible, I know of no evidence that can be adduced in support of it. Your program of directing mutations by radiations under the influence of fields is too far ahead of any validated knowledge .... So far as I can see we shall have to depend for a long time on the old-fashioned way of using such biological and psychological agencies as we already know about.

"As an exercise in mental gymnastics your program interests me, but I would not want to sponsor it as scientifically promising. Perhaps you will say the same about my excursions into philosophy in the Coghill book. But we both get a lot of fun out of the exercise."

It will be noted that the responses from Doctors Rhine and Herrick treated the problem objectively, without raising the question of whether this experiment would be a "good" thing from the ethical standpoint. Before plunging further into the hinterlands of speculation, let us look into the "ethics" of the program we are here tentatively trying to formulate.

X. ETHICAL OBJECTION TO RADIO EUGENICS

The next person I consulted was my friend and critic, Blodwen Davies. Her comments show great wisdom, and since the remaining developments in the theory are due in part to the effort to meet her criticisms, it is desirable to reproduce her several responses in her own words:

"My own reactions are purely personal, but I am definitely repelled by the idea. Your theory is incomplete and premature, and I feel that it is not in line with true evolutionary directions. I feel that we need a lot

more fusion of western thought with the psychological sciences of the east before we are ready to launch into any such plan as you propose. Have you any reason to believe that attacking the chromosomes would produce *better* types? Have any such experiments with insects improved on the old type? All I have ever heard about are the monstrosities.

"In one of your chapters in an earlier book you quote Mary Boole as saying that we feel as our ancestors thought, and so on. This illustrates what I feel about evolution. I would guess that we would have smaller, not larger, brains. The complex methods of experimental thinking we do today will be transcended as we become more intuitive. Do you think that an Einstein needs a bigger brain than a waiter? Or is it that they use the same kind of brain differently? Or do the geniuses use some of the 90% of normal, latent cells? Anyway, true human thinking is not done *in* the brain but is registered *on* the brain. If the experiment "worked," and you produced bigger brains, you would need the legal right to dispose of the "mistakes."

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"Your idea of using atomic energy to create mutations in chromosomes doesn't appeal to me. What indications are there that we would improve the present type of bodies? What we need to do is produce a social setting which will allow the present human organism to reach its maximum through education, good housing, food, and so on. A higher type of consciousness could never be achieved by a change in body type; it is a matter of psychic evolution, and of the development of the soul through rebirth. The only way to bring into incarnation more highly evolved souls is to create circumstances in which sensitive types are recognized and cared for, not handicapped because they are not aggressive.

"There are a great many ways in which we can immediately improve the race. When we discover the sensitive and advanced types of children, they can be given special upbringing which will protect their creative impulses. At the same time, we must teach them from early childhood the self-control and self-disciplines they will need when they come to maturity. Too much time is wasted now by the adult having to learn for himself by experiment the need for self-discipline not only of his acts but his thoughts and feelings. We will certainly not run out of jobs to be done for generations to come!"

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"I don't disagree in the slightest with the idea of forcing evolutionary changes by 'taking thought.' My

point is that if we do that, *we don't need radiations*! Nothing bears down more upon my mind than the sense of unused potentialities in people.

"A mental guiding field is something the West knows very little about. It is something the West will have to take into account, and when it does, it may be willing to abandon some of its dependence on machine effects. Actually, however, every group that is working to produce something new -- the Committee on Scientific Humanism, for example -- is creating a mental guiding field. We do these things, but we don't understand what we are doing.

"The glands will come into play not by being forced by radiation but by evolutionary states of the self. From my point of view the self creates in advance the structure it knows it will require in the future. However, the body has a heritage of its own, the ancient substances built into it, instinct with desires and energies belonging to the physical universe. The tragic element in all great drama is the struggle between these two forces, the transcendent self, with its will and purpose, and the elemental physical self, with its multiplicity of desires, responsive to every sense-provoking circumstance of life.

"The fact that man evolved toward the 'head-end' is not chance. The higher nature uses glands above the diaphragm and as the self begins to dominate, those glands operate more freely, infusing into life not merely the hormones affecting personality, but energies which cannot *yet* be put into a test-tube. Psychology as we know it is quite valid, *as far as it goes,* but we cannot delimit the power of the human being *by what we know now.* Berman writes about the "glands regulating personality," but Pantanjali writes on the personality regulating the glands. That is a field in which we have done little experimentation, and yet all preventive psychiatry is, in a sense, just that. Is there any good reason why we should not stimulate the pineal gland into providing some kind of energy that gives us vision in the world of consciousness?

"In other words, there should be some 'directives' in our planning. Experiments need to be prefaced by long and mature thought. Our atomic situation is a case in point. The discovery of the uses of atomic energy was pushed far in advance by the necessities of war, long before mature thinking about it had been done, and so we find ourselves in that no man's land which lies between disaster and a new society, and no one knows yet which way we shall go."

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"Why do we want to create a new species of animal? Are the scientists going off on stunts for their own sake? Or have they good reason for trying to create a new kind of creature? Suppose your experiment -- which would involve a number of people -- were successful, in one sense, and we found ourselves with enough mutated creatures to start a new strain. Might they not have characteristics that would put us 'old timers' at their mercy? Suppose, for instance, a strain was produced that is telepathic: they would then have the means of reading our thoughts at will. There would be nothing secret from them. We are not telepathic now, so would have no defence against them. Would there be anything to prevent a handful of such people from dominating the world? It would at least be a theme for a thriller!

"There is no need for you to drop the idea. It may merely be that you have had an unfinished experience, an insight that is valid but took form too quickly. If you would translate your insights into terms of consciousness, you might come very soon on some new methods of bridging the gap between today and tomorrow."

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Much of the argument of my Canadian friend (co-author of our book, *Planetary Democracy*) is based on deep understanding; as a warning, it contains much sound advice. But some comments by way of reply are called for. These will be presented next.

XI. A REPLY TO CRITICISMS

One might debate some of the technical issues: whether, for example, is it true that a more advanced brain would be smaller because humanity would be more intuitive and therefore free from the contortions of complicated reasoning. One might quote E. D. Adrian, distinguished physiologist, at this point -- to the effect that modern man *does* need a larger brain. (This could be true even if we use only 10% of our present brain capacity.) One might also point (Heaven forbid!) to the new electronic brains: calculating devices which are "better" in proportion as they are "bigger."

But such considerations are beside the point. We are not asserting that the mutations would produce "bigger" brains. What we are looking for is some way of transcending the *reason versus emotion* antithesis in some higher psychic function, raising consciousness to a higher level. How this is to be done is a problem in

neuro-psychology. Perhaps this could be a research problem for the biological division of a National Science Foundation. This would be a "Manhattan Project" for all mankind. The major powers of the world have their boards of military strategy planning the next war -- if and when it comes -- so why not have strategists planning a "reconstruction of humanity" which would make wars silly and impossible for all time? This would be accomplished by transforming human nature.

Another comment on Miss Davies' critique is that she has concentrated too exclusively on the role of radiation in *inducing* the mutations and has paid too little attention to the fields which, it was assumed, could *control the direction* of such mutations. My theory, even in its earliest form, was not based on an *either-or* premise: *either* chance mutations by radiation *or* conscious evolution by mental guiding fields. It is based on *both,* used simultaneously and in conjunction. It involves the idea that the glands will come into play (one possible medium for the inheritance of acquired traits) and that a new energy level will come into being. Such a theory, it seemed to me, came close to what Bucke had in mind in his speculations on the role of the emotions (i.e., endocrinology) in human evolution.

Of course this emphasis was natural at that time (in the early stages of my theory as presented to Miss Davies), because at that time I could give no assurance that the second factor -- control by a mental field -- would constitute a real factor of safety. Several years later, however, I became much interested in the work of Carl J. Jung, Swiss psychiatrist, whose theories about *archetypes* have considerable bearing on these matters. Now, after assimilating some of Jung's theories into my own speculations (this is already evident in previous pages), I am ready to return to the line of theorizing that was put aside several years back. But before returning to the subject of radio-eugenics, it is necessary to introduce the material from Jung which we need in the development of our theory. Even before that, however, let us list the problems as they now stand.

The full development of the theory of the "great experiment" calls for elaboration on three levels, as follows:

(1) *Psychological Level:* this is Jung's theory of mental archetypes, superimposed on the biological and physical levels of reality, also displaying archetypal forms.

(2) *Biological Level:* a theory of biological evolution (heredity and mutation). This could be a

theory of the macro-world and the micro-universe (genes), perhaps in terms of "resonance" between chromosome fields and the planetary field, with the sun acting as the pace-maker of evolution (as outlined in *The Promise of Scientific Humanism*).

(3) *Physical Level:* a theory of the relation between "matter" and "energy" which would, among other things, explain the origin of cosmic rays, yield an adequate meson theory, and quantum mechanical principles.

This is a big order. Fortunately, for our present purposes, it is not necessary here to deal with problems (2) and (3). But a full theory of man (a scientific humanism) will eventually involve a coherent theory on all levels, as indeed we have already shown. Now, however, we concentrate on our psychological problem of how archetypes are established to function as integrative forces on the human-social level.[1]

XII. JUNG'S THEORY OF ARCHETYPES

One of the great merits of Jung's lifelong investigations is the manner in which he makes clear the role of symbols in human functioning. Evolved primarily for purposes of communication and social integration, symbols have become the common denominator of cultural unity and creative art.

According to Jung, the primordial image or archetype (e.g., the *wise old man,* the *kingdom of heaven,* Plato's *cave* metaphor) is a figure or process that emerges in human consciousness and is so universal that it repeats itself in the course of history, especially where phantasy is present. These mythological forms, the themes of creative art, depict millions of experiences in the average man and are a kind of psychic residue in man's mental life. Every experience which has dynamic relation to the archetype calls up these nascent images or inborn *possibilities* of ideas.

The source of myth-making or symbolical art-work is not in the personal unconscious of the author, but in that sphere of the racial unconscious, the primordial contents of which are the common heritage of mankind.

[1] The following summary is based mainly on the following of C. J. Jung's works, Psychological Types, 1926 (Eng. trans.), and Contributions to Analytical Psychology, 1928 (Eng. trans.). I have also learned much about Jung's theory from conversations with Dr. Robert Clark, who studied with Jung on a Rockefeller fellowship.

This is what Jung calls the *collective unconscious.* Thus Jung's archetypes arise out of an inherited potentiality -- *mnemic images* -- expressed in anatomical formations in the very structure of the brain. These are not innate ideas, but inborn possibilities of ideas.

In this interesting theory we have the conception of latent images, below the level of individual awareness, developing through inclusions and exclusions of related material from personal experiences, until these psychic formations attain a threshold-value, where they release the energy concerned in symbol-making activity, and burst through into consciousness. Here, then, is the secret of effective art. The creative process consists in an animation of the archetypes, and the shaping of this image until the work is completed. This shaping of the primordial image is a translation into the language of the present and makes it possible for every man to find again the deepest springs of life. Herein lies the social importance of art: it is constantly at work educating the spirit of the age by bringing to birth those forms which the age lacks.

The symbol which converts energy is Jung's equivalent of the "libido." The rites with which sacred objects are surrounded disclose plainly their character as transformers of energy. According to Jung, Freud's sex symbols are not true symbols, since they have merely the role of signs of background processes. The true symbol is the expression of an intuitive perception which cannot be expressed differently because there exists as yet no adequate verbal concept. When, for example, Plato expresses the problem of cognition in his metaphor of the cave, or when Christ expresses the idea of the Kingdom of Heaven through parables, these are genuine symbols.

Just as analytical psychology must get rid of the Freudian medical prejudices, so it must transcend the Marxist thesis that myth is primitive man's fumbling attempts at what should be scientifically explained and therefore disappears as man gains mastery over nature. When the archetype is stirred, there is the moment of communion which is felt as something significant, linking us with a more universal pattern. At such moments we are no longer mere individuals, but outlets for those collective representations we call ideals that liberate the soul. The most effective ideals are variations of such archetypes.

With Jung's theory of archetypal forms supplying confirmatory evidence for the possibility of establishing collective images in individual consciousness (though

Jung offers no explanation for this), we now return to our own problem.

XIII. ARCHETYPES AS GUIDING FIELDS

Our hypothesis is that the concentration on and synthesis of a mental archetype for the "new humanity" would produce a macroscopic field which may in turn act on the micro-fields inside the germ cells. Just as (so I have heard) the patterns on some varieties of butterflies wings reproduce the patterns of the earth's electromagnetic fields of force in those regions in which those butterflies are living, so we posit that a globalized pattern of man's ideal image of himself might conspire with man-as-he-is to transfigure human nature.

This theory implies a kind of circular reaction arc (a "feed-back mechanism") operating between macro- and micro-universes. There is some evidence for such reciprocal causation. Thus, for example, if an electric current is sent through a solution in which a colony of paramoecia is living, the paramoecia orient (allign) themselves parallel to the flow of the current and point towards the same pole. On the other hand, as Doctors Burr, Land, and Nims at Yale University have shown, if the living organism (salamander) is rotated, a field is set up. Here there is a reversible causality, similar to that which obtains between the electric and magnetic vectors in a field of force. In an analogous way, we are suggesting that the cell constituents (chromosomes of the nucleus, or even constituents in the cytoplasm, or both) have micro-fields responsive to macro-field conditions or patterns.

This conception implies that if man could create a Platonic archetype for the man-to-be by a social synthesis of mental fields, perhaps this mental-social field could in turn act as a morphogenetic force to coerce the development of the same image in the embryological development of the energy Planetary Being. This would be the "recapitulation" theory in reverse. According to this approach, guiding fields of force are always the integrating factors which maintain the unity of the archetypes on all levels, from the physical through the biological to the psychological. Thus the archetypal pattern is like a Platonic *Idea:* it is a formative field of influence in nature. A visual representation of the situation is suggested in *Figure 2* (page 138).

Since electrical polarity is always fundamental in the processes of life, the same sort of polarity on a

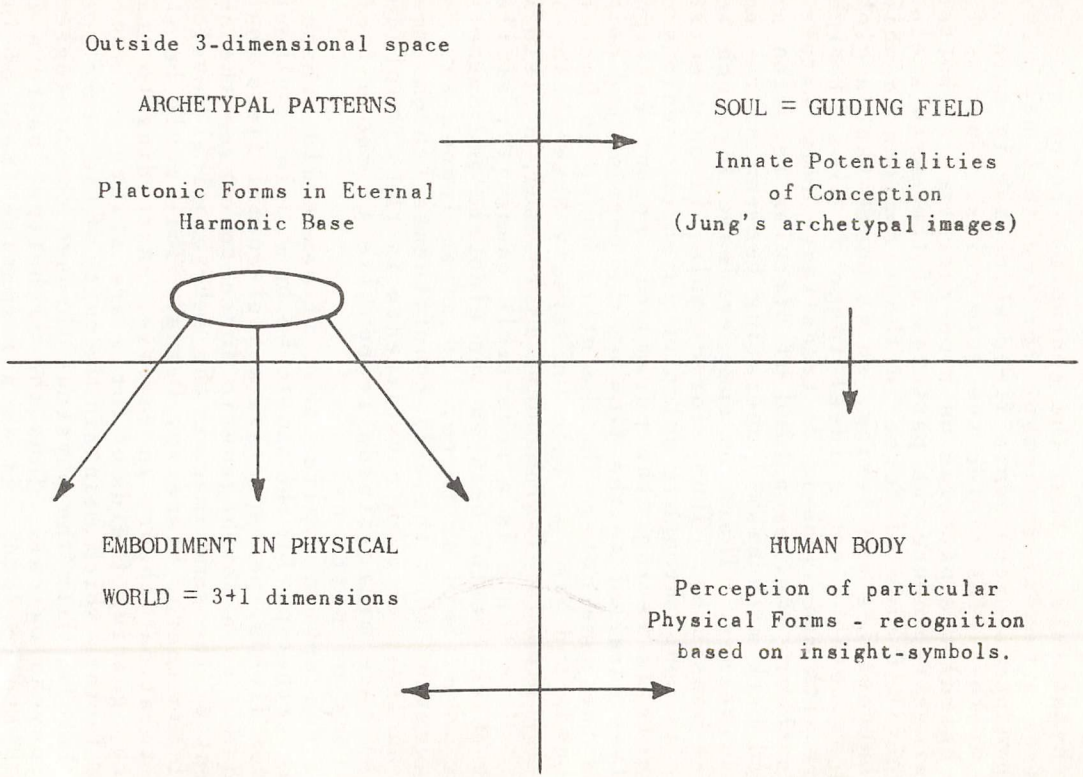
Outside 3-dimensional space
ARCHETYPAL PATTERNS
Platonic Forms in Eternal Harmonic Base
SOUL = GUIDING FIELD
Innate Potentialities of Conception
(Jung's archetypal images)
EMBODIMENT IN PHYSICAL
WORLD = 3+1 dimensions
HUMAN BODY
Perception of particular Physical Forms - recognition based on insight-symbols.

FIGURE 2

planetary level must be provided, if our experiment is to succeed. Moreover, if this polarity involved the co-operation of two billion human beings, it must focus on a social symbol (image) which has power to concentrate and *intensify* human energy, for this is our equivalent for the *repetition* of images in Jung's system. This symbol will involve the transmutation of individual experiences through a creative ideal which possesses strong integrative action.

Suppose, therefore, man has reached the place in earth-history where he is prepared to take his evolution into his own hands. He has decided on an experiment in mental-social vision to guide the genetic changes (micro-evolution) in conformity with the psycho-social image (macro-evolution), what should be the picture man should frame of himself if he is to be his own creator? Would the addition of another supra-granular layer to the cortex be the mutation required to produce a higher psychic synthesis? Or is there some other way to get the thalamic areas and the prefrontal lobes into some super-integration?

I cannot answer these questions. Perhaps, as previously suggested, this should be left to our engineers working in an Institute of Scientific Humanism. But even though we do not know the *modus operandi* whereby results would be achieved, there may still be reasonable hope that nature would find a way. I am thinking here of a similar situation in the individual organism. In a discussion of the implications of psychosomatic medicine by Dr. G. Evelyn Hutchinson *(American Scientist,* 1947, Vol. 36, p. 155), reference is made to the remarkable experiments in which blisters are raised at designated spots as a result of commands to persons under hypnosis. As Dr. Hutchinson puts it:

"The question that arises is how, in view of the general difficulty of learning any unfamiliar bodily operation, does the subject 'know' how to raise a blister at the spot designated by the hypnotist. Such an experiment seems in fact to imply some sort of unconscious intuitive physiological knowledge. It must be difficult to define such a concept in strictly operational form, but a rather detailed investigation of the situation in epistemological terms would seem desirable because it is hard to avoid the conclusion that the ordinary practical concept of knowing how to do a thing is not really applicable, while it is even more unlikely that any kind of innate response can be involved."

Of course the moral of the story is this: if there is a kind of "wisdom of the body" by means of which "intuitive physiological knowledge" operates, may this not also be the case in the relation between a world brain, socially visualized and held in consciousness, and the bodies (neuroblasts) of the human beings which function as the embryonic cells of the emerging planetary organism?

This, then, is the tentative form of our hypothesis as thus far formulated. Before leaving this baffling realm of mental visions, let us once more return to the ethical problem which is bound to bulk large in the thinking of many persons.

XIV. BACK TO ETHICS

The ethical argument that such an experiment, even if it were technically feasible, should never be undertaken because the use of atomic energy (radiations) is too dangerous, the mutants produced being lethal or retrogressive in the long run, certainly needs to be seriously considered. But as part of the rebuttal, one might submit the following propositions: (1) if we are to have another war anyway, atomic bombs of the hydrogen and plutonium variety are likely to be employed, and the resulting radioactivity will be doing its work regardless of ethics; and (2) the only way to prevent such a war is to undertake a planetary experiment so vast and so magnificent that the intense cooperation of all humanity is required. If, however, we *can* secure international control of atomic weapons, I agree that we should not use atomic energy (radioactivity) to initiate mutations, but only try the experiment as an exercise in the conscious control of human evolution through psychobiological guiding fields.

This is no mere academic discussion. As civilization is now proceeding, it is becoming clear that more and more people are breaking down, and this will continue, unless (a) we simplify our environment by evolving a meaningful and stable culture fostering integration within the individual, or (b) we evolve a human type capable of coping with an increasingly complex and unintegrated culture. But if we get (b) we will automatically get (a), and we can't get (a) except by way of (b). This dilemma is analogous to the old problem: can a man lift himself by his own bootstraps? The reply on the level of the psychological problem is that if he doesn't lift himself, man is going to sink back into the mud of the

ancient seas from which life first took its origin. We have here a genuine *either-or* -- either mass creativity or mass destruction. Which is it to be?

XV. UNESCO'S CHALLENGE TO WORLD SCIENCE

In the preceding pages we have set forth a proposal, a challenge to set up a planetary experiment to test the truth of the Michurin-Lysenko doctrine of inheritance. Our proposition is that the "East" and the "West" agree upon a great experiment in human genetics and evolution: the creation of a new psycho-biological structure to be integrated into the neopallium as an organ of intellectual-emotional synthesis, this structure to be proliferated out of the thoughtful aspiration of all men as they focus on a social image or archetypal form.

We therefore propose that the issue between Weissmann-Morgan genetics versus the Lysenko form of dialectical materialism ("Diamat") be made a test case to decide the conflict between the rival ideologies. Sponsored and supervised by UNESCO, Russian scientists and Western scientists would be invited to collaborate in carrying on this planetary experiment. If the results predicted by Soviet science were achieved, this would be accepted as proof of the correctness of Soviet science as applied to human evolution, and the West would accept the findings and conclusions. Thus the "new humanity" would be a living confirmation of the Marxist doctrine.

If, however, the genetics of Weismann-Morgan were confirmed, we would at any rate have established a basis for scientific collaboration and objective tests of truth. In that case, we would have set up a common basis for scientific research (since without such collaboration the experiment is impossible), and the Russians would have discovered that Western scientists are not the slaves of the "wicked capitalists" who are plotting the destruction of the Soviet Union. Thus the "greatest experiment in all history" -- could it but be undertaken -- would be bound to succeed, whatever the outcome, for world collaboration would have been secured by the very process of matching scientific knowledge in a vast experiment the outcome of which would provide the basis for the future world philosophy.

XVI. FINAL SUMMARY: OUTLINES OF PANTHEISTIC HUMANISM

In the foregoing chapters we have outlined the main features of a "scientific humanism" which we believe might capture the minds and the hearts of men. This humanism is based on a theory of *guiding fields of influence* and has affinities with Emerson's notion of the *Oversoul*. When Imagination thus becomes a common denominator of nature, man, and society, pantheism and humanism appear as direct consequences of each other, and we arrive at a philosophy which is best described as *Pantheistic Humanism*. Here, in summary form, is a statement of the main features of this philosophy:

1) In Pantheistic Humanism the universe is no longer conceived to be the world-machine of Newtonian-Laplacian particle-physics. The cosmos is now conceived as the expression of a *Guiding Field* (or *Cosmic Lens*), impersonal and non-anthropomorphic. This conception of a *Cosmic Image-forming Influence* which guides the evolutionary advance of nature is a contemporary restatement of the *Demiurge* of neo-Platonism, the *Nous* of Stoic philosophy, and welds into one world-view the mysticism of Bruno, Spinoza, and Emerson and the *unified field theory* of Einstein's relativity theory.

2) Behind the phenomena of nature which man investigates by way of his senses lies an *Undifferentiated Ocean of Electrical Energy,* eternal in time, uncreated, and outside all spatial coordinate systems. "Matter" emerges from this cosmic energy continuum through a process of concentration -- due to a focalization *via* the "Cosmic Lens" or "Supreme Imagination" -- whereby nodal points are individuated into the space-time matrix of our sense-perceptible world. *Imagination is a name for that reality in nature in virtue of which parts are made and put together to form products.*

3) The appearance and disappearance of matter (discrete particles) is not due to chance, but conforms to a law which reflects a balance between the world in space-time and the world outside space-time. *For Pantheism, God is not the Creator of Cosmic Energy -- He is the form-producing influence which operates within the matter-energy cycle to control evolutionary integrations.*

4) *Einstein's principle of the equivalence of matter and energy is a recognition of nature's equilibrium between the manifest world in space and time (the perceptible world) and the unmanifest world of the field-plenum from out of which matter emerges and into which it returns.* The ultimate particles of electricity con-

stitute the points of entry into the three-dimensional physical universe, and since matter and the field are cosmic complementaries and mutually sustaining, the reverse process of the annihilation of particles, dissolving into the field-plenum which is outside the space-time matrix, must also occur.

5) Thus we live in a cyclical, but non-repeating, universe within which "creation" on all levels of matter, life, and mind is taking place under the influence of guiding fields of individuation and integration. Cosmic energy, if it could exist alone and independently, would not be intelligent; only when it is endowed with imagination does it become intelligent. *Accordingly, energy plus imagination produces creative evolution.*

6) The physical universe, therefore, is the actualized body of the Supreme Imagination, being composed of cosmic forms that have been crystallized as visions of reality as these have been structuralized in the ever-evolving patterns which are in fact the history of the universe. *Cosmic evolution is a never-ending and creative advance within the manifest universe.*

7) Now the obligation of man is to take over the uncompleted drama of evolution and carry forward the story of creation to its next climactic scene. *The god-in-man is nothing other than cosmic energy become aware of itself as imaginative foresight.* Cosmic energy is a non-moral force in nature, until it reaches up into human consciousness as integrated personality. Human freedom is the vision of future possibilities, the imaginative construction of forms to be created on the basis of past achievements. Human freedom is conditioned by biological heredity and the cultural forms of the social matrix.

8) *In order that humanity may survive and continue the "creative advance of nature" (Whitehead), man requires a scientific basis for morals.* He needs to realize that physical laws and moral principles are interwoven on the human level, so that the regulative principles of a universal civilization are not arbitrary conventions, but do in fact provide the firm foundation for the good society. The actualization of creative imagination is the morphogenetic force behind physical, biological, and human social evolution.

9) *Both communism and western science forgot something, and that is the Supreme Imagination which gives form to all the products of nature, and without the Cosmic Lens the whole show is meaningless and absurd,* as the French Existentialists have pointed out. Why man is on this tiny speck of the universe that we call the earth will be understood only as we increasingly comprehend the

universal scheme of things. Thus man's highest mission is to understand and enjoy the productions of the Supreme Imagination as these are revealed in nature.

10) *To present a real alternative to communism, a new world philosophy must be evolved by man, and this might well combine Pantheism and Humanism.* This Pantheistic Humanism would appear as a scientific world-view providing a mediating ground between the atheism of Russian communism and the theistic supernaturalism of the Hebrew-Christian religious tradition of the capitalistic-democratic countries that are combatting communism.

11) The major religions of the world (Hinduism, Judaism, Christianity, Mohammedanism, Communism, and the rest) started out as regional religions with characteristics peculiar to the times and places of their origins. All local religions with their regional gods are therefore stations along man's way -- his upward climb toward his own divinity; they are manifestations of man's endless effort to envisage that Supreme Imagination in whom we live and move and have our being. But these traditional religions have erred in laying claim to final truth, once for all revealed. In Pantheism there is a sense of reverence in the presence of an awe-inspiring universe, but there is no finalism of creeds. This is so because there is no end of man -- he is still on his way!

CHAPTER X

THE ALCHEMY OF ENERGY

QUEST

Through the tangled patterns of time,
Through the wilderness of worlds,
Over the bodies of dead melodies
I trailed a sinuous impetus
And tracked the Soul of Movement to a lair ....
Through the catacombs of decaying harmonies.
To the last frontiers
Of a singing flame
I followed ....
After.

Perched on a parapet of the world,
Ensconced on an island universe,
Improvising on the cusp of a conical flute,
I found the Dreamer of luminous tones ....
Transposing a melody!
In a cavernous thule of the Unconscious
Time, the Virtuoso, intones a melancholy rune --
With phosphorescent fingers He spins His chords ....
In the black recesses of midnight space
He strikes His flints
And builds
Glowing
Melodies.

With threads of space and time
On the loom of nocturnal skies
He weaves the pattern of images ....
Spiraloids of energy, linked in harmonic progression;
All existence is the pattern, and experience the
transient melody ....
And the vibrant urge of the sinuous tune
Is the restless stirrings of a Cosmic Dreamer
Who dreams that He dreams,
And longs for the peace of imageless sleep ....
But the musical shuttle weaves its patterns
Playing its mosaic of aureoled melodies --

His incandescent eyes are stars ....
sputtering torches ....
Florescing sleepily in the black cadaver of space,
While He hums a tune,
A fugue in black and white,
With minor chords of dissonance ....

MOVEMENT

Long had I stalked Him
Along the labyrinthine paths
Of a wave-like melody ....
Clinging to the tortuous strands
Of that twisted rope we call Reality,
I trailed the Ariadne's thread
Stitching the tapestry of nature;
Searchingly I trailed the Soul of Movement
Through the reiterative melody of time.
Threading the momentary flashes of sentience
In the darkness of silence and chaos
I stalked the luminous tones;
Following after in winged pursuit
I sped the fleeting electron its glistening wake ....
Down the depths of stellar crucibles,
Along the shingles of ultimate boundaries
I followed after.
Smothered in interlacing fields of energies,
Strangled in the suction of whorling space,
I lived to breathe again
And circle and skip in atomic orbits;
Smashed by the splintering fission of atomic nuclei,
I revived in the rhythmic swirl of molecular harmonies;
Stunned by inchoate masses,
I gasped the cry of rebirth in quasi-living crystals.

Straining to catch a chord
In upper keys,
I builded a more sensitive sounding board ....
With the darkness of the inorganic and an ultra-
violet ray,
A fertile photosynthesis,
I fashioned protoplasmic resonance chambers
And vibrated to the meter of living melodies ....
To the cadence of vital rhythms,
To an organic configured melody
I danced in cellular choruses.
Groping into unfamiliar tonalities

Chanting a tune in melodic progression,
The organismic symphony advances ....
But through the evolutionary orchestration
Runs an undertone of dissonance:
It is the Dreamer stirring uneasily in His sleep --
His dim forebodings of disaster half-awaken him ....
As the music of human consciousness
Prefigures a mosaic of death hues
Silhouetted as liminal flashes
Across the threshold of the Dreamer's troubled fugue.

ETERNAL SAKI

Through the mutation of forms,
Linking atomic crucibles and stellar furnaces --
World upon world, in mounting patterns --
I followed the musical movement ....
At the edge of reality I found an Improviser
Transposing a melody:
With the harplike music of Memnon
The world is set singing -- a pattern of strings
Resounding to light.
Silence, the universal solvent, stills the chords ....
And thus on the ruins of dead melodies
He builds.
He strikes the muffled silence
With a wave of music.
And a flame He kindles -- a coruscating melody --
But the reflex of His fires, a consuming flame,
Sears - - - - corrodes - - - - and burns
Dead melodies.

Light, a sea of undulating energy,
Is filtered by the pattern of the stars
And fragmented into iridescence
By the bubbles it rides --
The Eternal Saki pours His singing bubbles
From an efflorescent bowl;
With a flaming flute,
He blows a serpentine tune ....
Stars - - - - rays - - - - atoms - - - -
cells - - - - consciousness
This is the ancient melody, the caravan of time,
Cascading in misty globules
Over the rim of a flaming flute;
But darkness is the solvent that mutes the tones --
Splinters of color melt and dissolve

In the mortuary of dead melodies ....
And the pathos of time
Is the evanescence of all harmonies.

The grains of sand men call the stars
Are scattered like dust through the voids:
A fine-spun gossamer is the Milky Way
And a diaphanous veil is a nebulous spiral ....
But I pierced the masque of the Cosmic Dream
And confounded the Sphinx with a remembered rune;
I caught the chords of magnetic waves,
Fragmented on the shores of an electric ocean,
And heard the Poet utter a simple theme:
Tuned to waves that arise and die away,
Life ascends the curve of youth and growth,
Projecting the triumph of vital resurrection
Into cataphonic myths of solar gods
Enacting the drama of cosmic saviors;
But the crescendo of rejuvenescent flames
Sinks into the dirge of a funeral pyre ....
The black mass of senescent harmonies
Decaying, like drift-wood in a tide,
Sucked into the vortical undertow
Of obliviousness.

TRANSMUTATION

In the crude clang of human fundamentals
I stalked the Improviser's leitmotif ....
-- But found him not ....
Not in the wail of the storm wind,
Nor the nightingale's threnody;
Nor even the silence of nature's frozen music:
The architecture of a crystal,
Or the startled stillness of a snowflake.

In the refined overtones
The sublimated melodies
O human subtleties
I followed after ....
In human arts and savant's tones of learning
I hounded the Composer of Melodies
-- But found Him not.

Not in human creativeness
Phoenix-like rising on the ashes of dead aspirations,
Not in the alchemy of living energy

A Promethean spark flickering in protoplasm
Hungering, Icarus-wise, for more ethereal fires
Is there a chord free from dissonance.

Not in the quest of a golden fleece
.... Or a holy grail
Lies the consummation of consonance
Not more in a saint's heart
Than a sinner's plot;
For chordiness is based on dissonance
And in life's symphony of good and evil
Black and white are cosmic contrapuntals.

Striving to quench the desires of a Faustian complex
Humanity spends its libidinous energies ....
While through winds of history, the chords of time,
Swirling down the centuries,
Runs the discord of a fugue in black and white,
The rhythm of a wave-like impetus
That arises and dies away ....
Listen .... and in the silence of the cosmic night
You may hear the backwash of evil
As the Protean stream of cosmic energy
Breaks and recoils
Along the shores of reality!

COSMIC EMOTION

The Cosmic Improviser intones His dream
And weaves the pattern of melodies ....
The tones of His pattern are atoms
And the chords of His melodies stars --
But through the harmony runs a dissonance
Of which silence alone is the solvent.

The atoms of space called stars
Throb in endless pulsation ....
Snow falls softly, but stars tinkle as they throb:
And the melody is like the spattering of tears ....
Through the hoary refrain runs a dissonance,
A river of molten tears,
Streaming through the cosmic mist of a galactic veil.

On the brink of the world I found Him
Dreaming chords which arise and die away ....
And each note is a star;
But the chords are dissonance --

Musical patterns, like the petals of flowers,
Wither and die away:
In the death of a star,
The husk of a burned-out sun,
Is a world-soul crucified.

SAMSARA

Long had I stalked Him --
Threading the sinuous paths
Of the Soul of Movement,
Rising on the bodies of dead melodies,
I followed after.

Through life in death and death in life
I trailed the musical motif:
For the arc of a living impetus
Traces a curve which bends toward death ....
A body loses its soul of harmony in a pulse of light,
And the soul of body takes wings on a wave;
But rebounds at the outermost confines of space,
And intones the chords called atoms:
For the tomb of matter is the cradle of movement,
Where the Improviser gains a soul by losing a body,
And wins a body by losing a soul.

NIRVANA

Through the catacombs of dead melodies
I shadowed the Dreamer of luminous notes;
To the last frontiers of a singing flame
I followed after --
On the brink of a whirling flute,
Where the past and the future mingle,
I found him ....
Transposing a melody!

SPHERICAL HARMONICS

On the cusp of a conical vortex
I found the World Dreamer, humming a tune ....
To the rhythm of the wave-like sway of Time.
At the edge of a relativist universe,

Where the tomb of body is the birth of motion,
I found a singing flame -- a whirling Lens of Light --
Spinning .... faster .... faster .... faster
To straighten a wobbling sway ....
Intoning a melody
To drown the dissonance of the wobble --
Spinning the darkness of imageless sleep
With a luminous melody.

Creative Energy speeds on its restless dream
of pain-reality ....
And in the twisted images of a spiral melody
Patterns of meaning flicker and fade -- and flame again:
Levels of being, negated by matter-dissolving forces,
Muting the music of ancient forms.
Rising above the inundation of darkness and decline,
Rhythms of recurring spasms of creativity,
Pierce the archaic forms with each new ingress
Of higher conflicts ....
Ancient enigmas reiterated,
Fleeing from form to form,
An alchemy of energy, multitudinous, intense,
Mounts the mutation of spiral forms,
Lured by the conjugate intimacies of nature's
fertile alchemy ....
Endless, intricate oscillations of magnetic melodies
That rise and fall -- and die away.
At the brink of the world
On the ultimate rim of nothingness
Where the past and the future mingle,
Is a conical Vortex
Spinning a spherical lullaby ....
Life, instinct with death,
Pines for the peace of the inorganic;
Death, bored with the darkness of silence,
Picks up the music of consciousness ....
Then longs for the calm of imageless sleep --
While along the encircling paths
Of a serpentine melody
All waves recoil
And turn
Back ....
To build anew
In higher dimensions
The emergent chords
Of a World Sensorium
Of the New Humanity ....
Man .... the Alchemist .... creator of trans-
uranium elements,

Dreams His dream of cosmic transmutation
Thinks his symbol-thoughts .... neuroblasts in
emergent being,
And spiraloids of energy
Incurving across the brain lobes
Reverberate the dream-echoes
In the higher cosmic spaces ....
Symbolic forms
Of the MAN-TO-BE ....
WHO WILL BE GODLY!

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